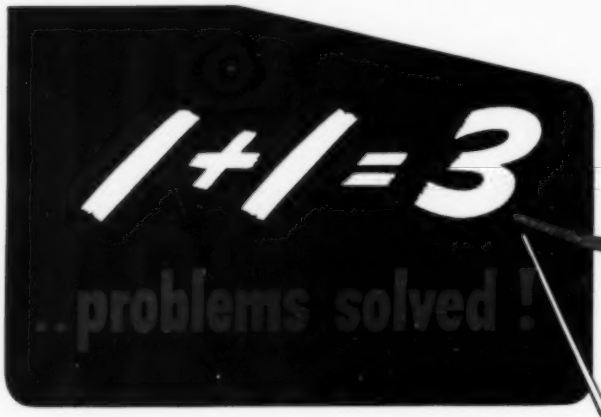
Coal Age

CUTTING COSTS.. p. 70



1. Increased HAULAGE
2. Lower COST
3. Greater FLEXIBILITY

YOU CAN BE SURE.. IF IT'S
Westinghouse

with Tandem Mine Locomotives . . .

Here's a versatile team, unmatched in solving these three important problems . . .

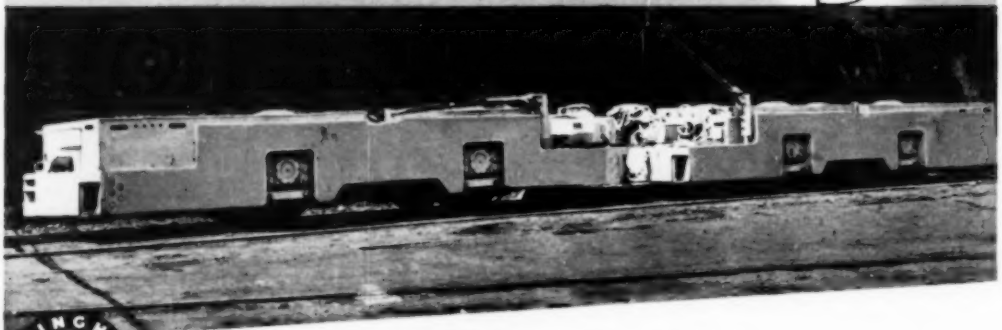
Increased HAULAGE . . . by merely adding one locomotive to the one you have . . . for double capacity. This tandem arrangement is made up of two, 2-motor locomotives . . . eliminating the necessity for heavier, single-unit locomotives. The result is . . .

Lower COST . . . because the necessity for heavier rails is eliminated. A 40-ton, single-unit locomotive would be too heavy for most rails to handle. Two 20-ton locomotives have equal capacity, do not require special track . . . and have the further advantage of . . .

Greater FLEXIBILITY . . . for both locomotives can be used in tandem for heavy loads, or individually, to haul smaller loads from the sidings. They can then be coupled at a central point for hauls out of the mine.

For further details, call your nearest Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15127



WESTINGHOUSE

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES [illegible]

Mine Locomotives

"All aboard" for 14 million crashing tons

A typical example of B.F.Goodrich product improvement

THOSE are chunks of coal, some weighing a ton apiece, on their way to a boat ride. It's a rubber conveyor belt they are riding, to ship side. Coal cars crash these heavy lumps onto the belt from a height of 15 feet. It's a wonder that belts lasted 5 years and carried 6 million tons of coal; that was a testimonial to rubber.

But still B. F. Goodrich wasn't satisfied. Engineers here had been working on a new principle of conveyor belts called cord belts, for just such crashing impact. In this exclusive design individual cords run lengthwise, each floating in rubber—the whole belt can "give" and absorb impact blows whereas old stiff woven belts had to stand and take the blow and so of course tore, broke, wore out.

The belt in the picture is the first cord conveyor belt ever installed. Instead of the 5 year previous record it has already lasted 11—and look what it's still carrying today! Instead of 6 million tons it has carried 14 million, and engineers estimate it's good for 6 million more.

And it is exposed to sun and ice, Ohio River floods, wet sharp coal—every possible condition that would ruin other, ordinary rubber belts. Its B. F. Goodrich patented construction stands them all.

Here is a perfect example of BFG research which is constantly lengthening the life of rubber products, and so reducing their cost to industry. It is the research you benefit by when you call in your B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

Always "Open Season"

Everyday in the year it's open season for hunting the destructive vicious FRICTION DEVILS that lurk in your mining machinery and feed on slowups and breakdowns. You can get every last FRICTION DEVIL out of your mining machinery, with HULBURT QUALITY GREASE.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

for FRICTION DEVILS

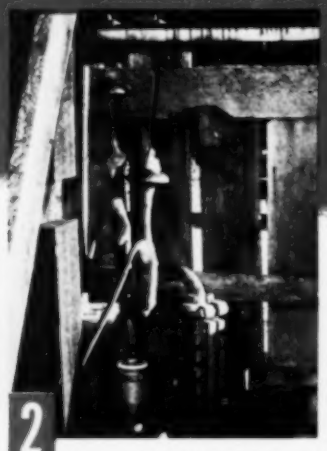
HUNT-
TRAP-
KILL
THEM
with

Hulburt *Quality* GREASE

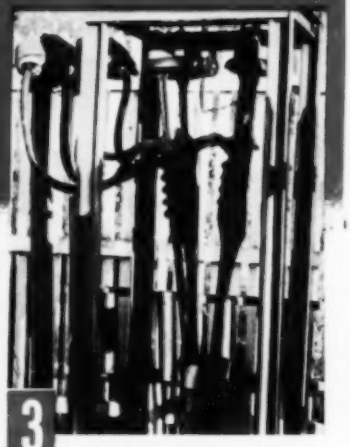
You don't need a hunting license—all you need is a supply of the big blue drums, loaded with HULBURT QUALITY GREASE. That's the finest ammunition to kill FRICTION DEVILS! Hulburt Lubrication Engineers will show you where to find FRICTION DEVILS, and will help you save dollars, time, power, shutdowns, bearings, maintenance.

5 GOOD WAYS TO INSTALL SHAFT OR BOREHOLE CABLE

1 **LIGHT-WEIGHT ALUMINUM BOREHOLE CABLE** suspended by strain insulators clamped to conductors. This 5KV cable with ground wires is 3/c 350,000 CM with Hazard long-lived, high voltage Keystone oil-base insulation and an overall covering of a tough, moisture, flame, and weather-resistant Hazaprene ZBF Sheath. Borehole is 700 feet deep and carries a 2,300 volt a-c circuit to an underground rectifier station. Cable length is 1050 ft. from outside power line to underground station.

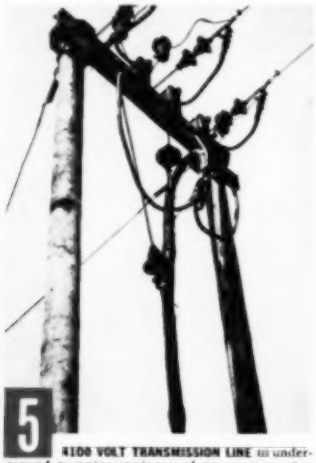


2 **CONCENTRIC SHAFT-CABLE INSTALLATION** 250-volt, d-c, 1,000,000 CM concentric cable suspended in conduit in shaft by means of I beams installed over shaft opening. Concentric conductor clamped, with copper strands bent back and refastened over clamp. Two 350,000 CM, 250-volt d-c cables also installed in shaft in conduit. These cables are supported from steel beams by strain insulators and clamps to conductors. All insulation is 600-volt Watertite with a protective sheath of Hazaprene ZBF.



3 **4 CABLE INSTALLATION** suspended from simple steel structure. Each cable is 500,000 CM, carries 550 volts d-c with two positives and two negatives. Conductors have Hazard moisture-resistant, 1000-volt, Watertite insulation. Unequalled outside protection against moisture, flame, acids and mechanical damage is provided by tough Hazapreene ZBF Sheath. Borehole is 500 feet deep with cables held by strain insulators and strain clamps on conductors.

4 **SIX D-C FEEDER CABLES** installed in a 600-foot borehole. Each cable is 250,000 CM, with 600-volt Watertite insulation and a tough Hazaprene ZBF Sheath. A strain insulator with clamp connected to the conductor supports these cables individually from simple steel structure.



5 **4100 VOLT TRANSMISSION LINE** to underground pumping stations and power-conversion stations for d-c haulage and mining equipment. Cable is a 3/c, 4/0, 5000-volt Hazard Borehole cable with long-lived Keystone oil-base insulation protected over-all by a Hazaprene ZBF Sheath. Suspension is accomplished by two strain insulators and Kellems grips.

HAZARD MINE POWER CABLES ENGINEERED FOR BOREHOLE USE GIVE YOU A DIRECT, TROUBLE-FREE, ECONOMICAL CIRCUIT TO UNDERGROUND WORKINGS

THERE are many good ways to install borehole or shaft cable, and on this page are shown some typical methods that have proved successful.

Of vital importance, of course, to any borehole or shaft installation is the design and construction of the cable used. And there is a wealth of first-hand experience in the selection of mine power cables readily available to you. Over the years, much Hazard research and engineering has been devoted to developing specialized mining cables—in cooperation with mining engineers — that simplify installation problems and costs . . . that assure long, trouble-free service.

An experienced Hazard engineer will be glad to discuss your own particular operating requirements with you. Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, N. J.

7729

HAZARD insulated wires and cables for every mining use

Coal Age

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HEY LOOK!
P&H'S NEW 955-A
WITH THE FAMOUS
MAGNETORQUE* SWING!
YEAH, FIRST TIME ON A 2½ YARD MACHINE
YES, AND IT HAS ALL THE FEATURES OF THE FAMOUS 1055
SWING POWER IS ELECTRO-MAGNETIC - NO FRICTION - - NO WEAR!
IT CAN BE SHIPPED BY RAIL, COMPLETELY ASSEMBLED!
P&H

Look to P&H for Added Values

You should see the new P&H 955-A in action. Look it over—you'll see what we mean. Even the price is good news. You'll agree the 955-A is the machine for YOU. Don't wait, write today for Bulletin X-122.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

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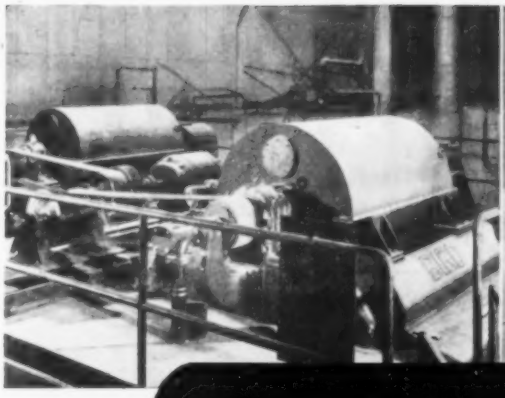
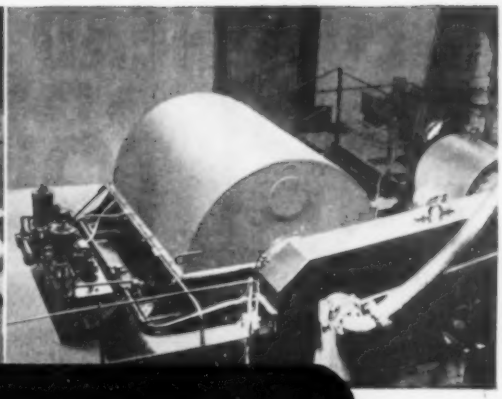




50,000
TONS PER DAY

of ¼" x 0 coal is now being dried by

BIRD COAL FILTERS

The BIRD accepts the fine coal from any washing process and the feed can contain as little as 25% solids. It handles up to a ton of coal a minute.

The BIRD gets the coal dry — as dry as or dryer than it can be obtained by a whole series of other units.

The BIRD gets the water so clean a closed circuit is readily effected.

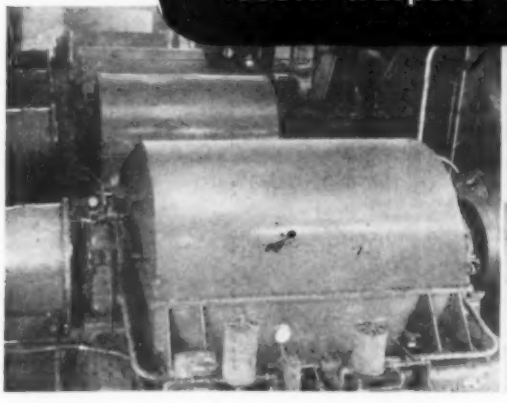
The BIRD runs continuously for months without overhaul.

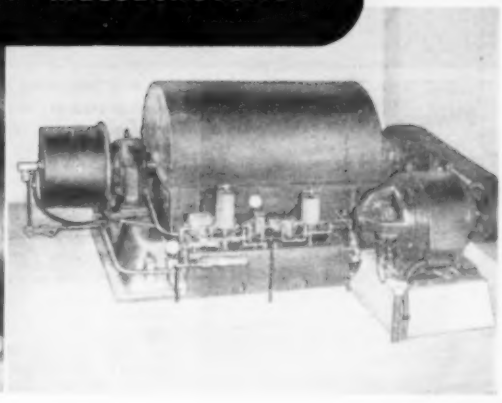
. . .

Want the whole story? Ask us to mail you the Bird Coal Filter Bulletin.

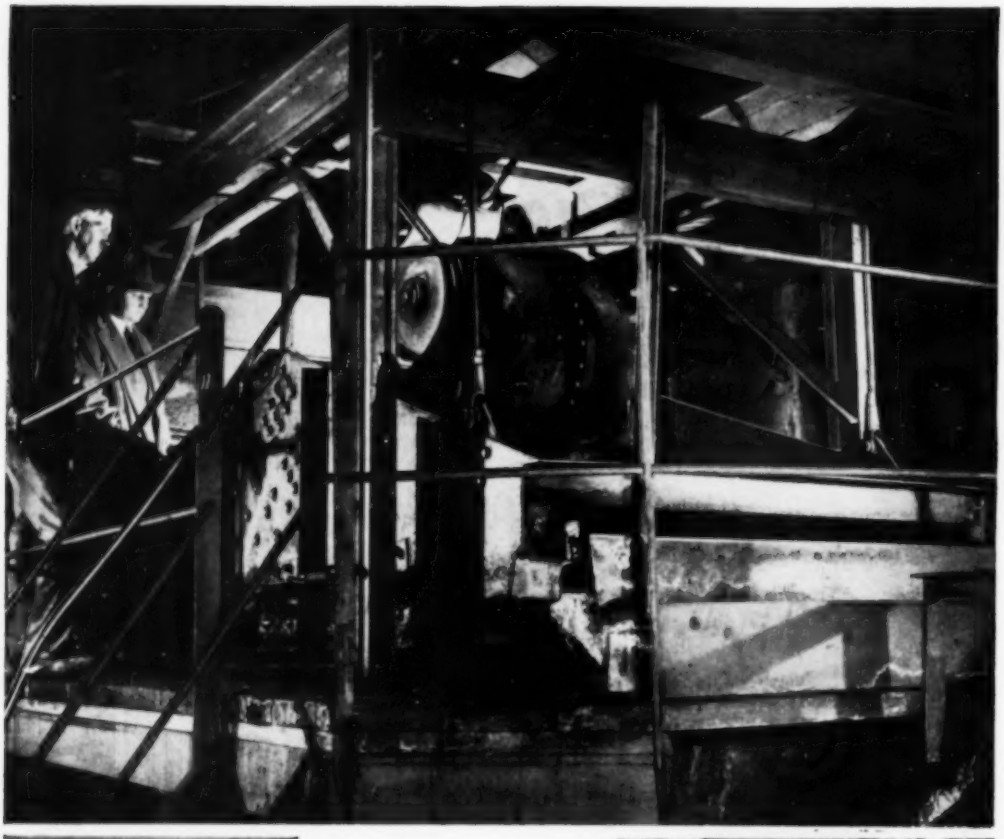
BIRD MACHINE COMPANY

South Walpole • Massachusetts



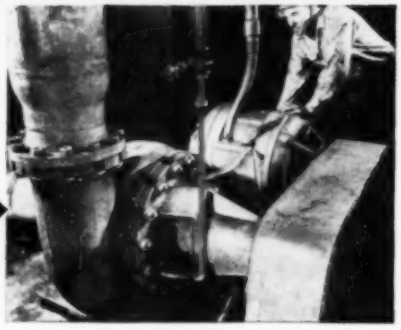


"LOW-HEAD DEWATERING Paid for Itself in



CLOSE-UP VIEW of end-tension deck installed on the 5 x 14 ft Low-Head vibrating screen shown above. Water sprays wash the high ash fines through 20-mesh stainless steel deck. Vibrating mechanism has not been opened for repair in over five years' operation. Overflow water from settling cone is recirculated with Allis-Chalmers solids pump.

CW SOLIDS PUMP is an important part of the dewatering screen installation. This 12 x 10 Allis-Chalmers pump is rated 4,000 gpm; 40 ft head . . . has only five *easily removable* working parts. Motor is an Allis-Chalmers 60 hp induction type with Texrope drive.



SCREEN 37 Days!"

"WE'RE RECOVERING $130 WORTH OF 4x20 MESH BITUMINOUS COAL FROM WASTE SLUDGE EVERY DAY"

. . . SAYS MR. CLAUDE CARTY
of Hickory Grove Coal Co.
SULLIVAN, INDIANA

SIMPLE ARITHMETIC
11 TPH saved every 7-hour day = 77 tons.
Additional revenue @ $1.75 per ton:
77 x 1.75 = $134.75
Screen and Pump cost approx. $5000.
Paid for itself: $\frac{5000}{134.75}$ = 37 days.

AND IT'S ALL PLUS REVENUE! Twenty tons per hour of 4-mesh x 0 sludge was waste before this Low-Head dewatering screen and CW solids pump combination was installed. Now, an average of 11 TPH of 4-mesh x 20-mesh fine coal — readily salable at $1.75 per ton — are recovered every hour. Adds up fast, doesn't it? Not only that, pumping cost is less because there's less sludge pumped to waste.

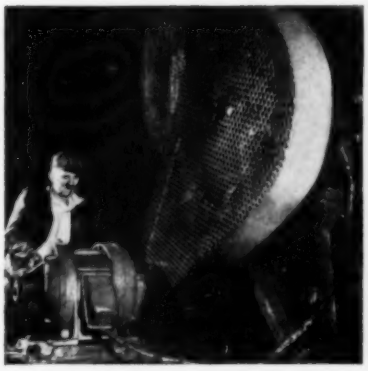
This is *typical* of the way Low-Head vibrating screens are turning waste sludge into profit in *numerous* coal washing plants! Low-Head screens are money-savers in dewatering small size coal, too. End-tension deck construction turns coal over repeatedly, assuring thoroughly efficient drainage. Low-Head screens with side tension decks are used for dewatering and sizing large coal and for pre-wetting ahead of heavy density units. Horizontal operation saves headroom, cuts installation costs. Sizes from 3 x 6 to 6 x 16 ft.

The A-C representative in your area will gladly show you how a Low-Head dewatering screen installation may pay off for you in added profits. Call him, or write for **Bulletin 07B6330B.** A-2792

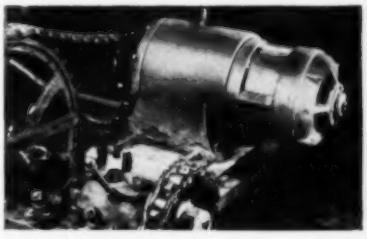
ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

Low-Head, Texrope are Allis-Chalmers trademarks.

OTHER COST-CUTTING PRODUCTS FOR COAL AT HICKORY GROVE



This 25 hp Allis-Chalmers induction motor drives a fine coal conveyor in Hickory Grove washing plant. Motor is equipped with Texrope V-belt drive. The Allis-Chalmers motor line includes totally-enclosed fan-cooled types . . . splash-proof motors . . . large d-c and synchronous motors. Allis-Chalmers also builds a complete line of motor controls.



Compact 7½ hp Allis-Chalmers Gearmotor drives a surge hopper in coal washing system. In operation since 1937, only maintenance required on this unit has been lubrication. Gearmotors have high power factor, are used where slow speeds are required. Output speeds range from 7.5 to 780 rpm. One to 50 hp.

ALLIS-CHALMERS

... Builds for Coal Industry Progress!

A-C ALLIS-CHALMERS

Better Bearing Protection means Better Production

GET BOTH by lubricating anti-friction bearings with Texaco Regal Starfak

Tonnage moves on the bearings in your locomotives, cutters, loaders, shakers and other machinery throughout your mine. Wherever there are grease-lubricated ball and roller bearings, protect them with *Texaco Regal Starfak*. It guards the bearings against rust and wear . . . assures smoother operation . . . raises production and lowers costs.

Texaco Regal Starfak remains stable throughout its long service life. It has high resistance to oxidation, gum formation, separation and leakage. Its low starting torque . . . saves you power . . . sharply reduces the need for bearing repairs and replacements.

For low-speed anti-friction bearings in heavy-duty service, use *Texaco Marfak*. It clings tenaciously to bearing surfaces . . . assures constant protection against wear . . . prolongs bearing life . . . cuts maintenance costs.

Texaco has lubricants for every mining requirement. Let a Texaco Lubrication Engineer help you select the ones you need. Call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C.*, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO LUBRICANTS

TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco lubricants for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

For the Coal Mining Industry

Power cost— 6.4¢ per ton!

This G-E portable rectifier, one of three in the Shamrock No. 1 mine of the Truax-Traer Coal Co., is rated at 300-kw, 275-v d-c, and designed for 4000-volt and grounded negative operation. The units have needed little or no maintenance since their installation except for tube replacement and periodic inspection.

Economical G-E mercury-arc rectifiers helped keep power costs down to this low figure, are quickly relocated at little expense, offer no maintenance problems, says Mr. Howard Petty, Electrical Superintendent, Truax-Traer Coal Company.

In June 1946 the Truax-Traer Coal Company installed a General Electric portable, sealed-ignitron mercury-arc rectifier in its Shamrock No. 1 mine at Kayford, West Virginia. Two identical units were added in March 1947. For sixteen hours per day, seven days per week, these rectifiers have been in continuous operation, available for service practically 100 per cent of the time.

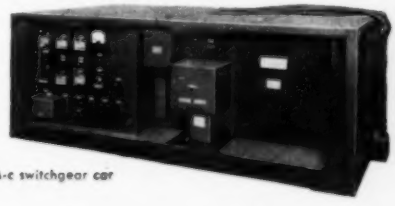
Because of the advantages offered by General Electric mercury-arc rectifiers, Truax-Traer has now ordered four more equipments of latest design. With these in service, *all* power for this mine will be supplied by G-E portable sealed-ignitron mercury-arc rectifiers.

Why not check how G-E mercury-arc rectifiers can cut *your* over-all mining costs per ton? A wide range of ratings is available. For more details, send for Bulletin GEA-4047. *Apparatus Department, General Electric Co., Schenectady 5, New York.*

According to Mr. Howard Petty, the Company's electrical superintendent, G-E mercury-arc rectifiers have provided the following advantages:

1. **LOW POWER COSTS.** The three units helped to keep power costs at an all-time low: only 6.4¢ per ton.
2. **FAST, ECONOMICAL RE-LOCATION.** After a place is prepared, the entire unit is moved and back in service in only four hours.
3. **MINIMUM MAINTENANCE.** No major rotating parts.
4. **EASY PORTABILITY.** Entire unit can be moved close to the working face.
5. **PERSONNEL SAFETY.** Units are completely enclosed to prevent accidental contact.
6. **HIGH OVERLOAD CAPACITY.** The equipment can be operated at 150% of rated maximum load without damage.
7. **LOW-SLUNG DESIGN.** Maximum height of only 48 inches permits these compact units to be used in cramped areas. (Standard 42-inch units also available.)
8. **DEAD-FRONT PANELS.** Give maximum personnel protection, as well as keep out coal dust and dirt.

THREE INTEGRATED CAR UNITS make up a G-E portable mercury-arc rectifier. Compact and efficient, this equipment permits conversion from a-c to d-c thousands of feet closer to the working face. It makes long, low-voltage d-c feeders unnecessary, assures full voltage at the working face for efficient operation of locomotives, cutters, loaders and other mining machines.



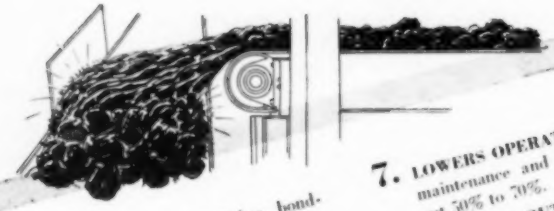
A-c switchgear car

Transformer car

Rectifier d-c switchgear car

GENERAL ELECTRIC

Here's where Coal-Flo saves you money



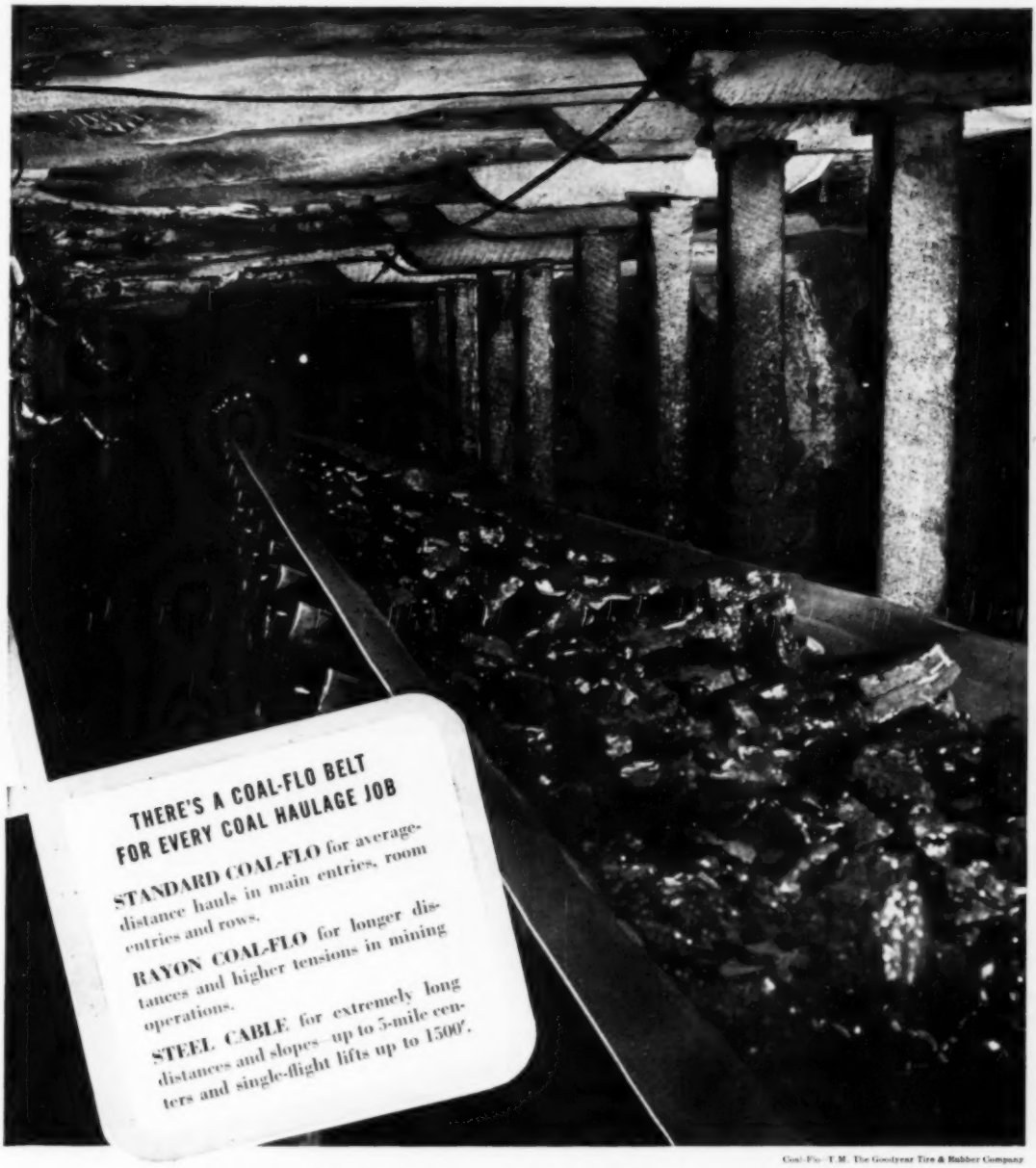
1. **ELIMINATES TRACKAGE**, switches, bonding, heavy grading.
2. **CUTS TIMBERING COSTS** by 50%, because belt runs close to rib, lets you use single props under center of roof load for far greater safety with much less timbering.
3. **REDUCES COAL DEGRADATION.** Belt runs efficiently over pitches and rolls without jamming or mashing coal—greater clearance between roof and belt, plus gentler handling, gives you up to 20% more coal in low seams.
4. **STOPS HAULAGE INJURIES**—no danger of runaways with peril to "hot-footers."
5. **"UPS" TON-PER-HOUR CAPACITY** with continuous haulage—no time lost for car spotting—cutters and loaders have no time out.
6. **LESSENS FIRE AND EXPLOSION HAZARDS** through elimination of bare wires and charged coils, sparks and open wires.
7. **LOWERS OPERATING OUTLAYS**—power, maintenance and operating expense are all cut 50% to 70%.
8. **SMOOTHS OUT DELIVERY AT TIPPLE** because it's continuous, uniform and automatic.
9. **ENDS BRUSHING**—you leave your gob inside, even in low-seam coal, because belts need minimum head-room.
10. **NO NOISE** to keep you from hearing a "working" roof.
11. **GREATER SAFETY** because safer timbering and no operating vibration end threat of roof falls.
12. **LEVELS VOLTAGE REQUIREMENTS**—no peaks and valleys or surges, and better voltage regulation compared with intermittent operation.

CHECK these points where COAL-FLO belting can save you money in hauling coal from face to tipple. No guesswork about them—these are actual savings made with COAL-FLO—they're proved ways to cut down climbing cost-per-ton.

But that's only part of the story of COAL-FLO savings. Every COAL-FLO belt is built with tough acid-resisting rubber and is mildew inhibited throughout to protect it against underground moisture, acidic waters and mildew. That means COAL-FLO belts last longer—keep cutting your costs longer—carry more tons of coal at lower cost in the long run than any other belt.

PROOF? *More tons are hauled on Goodyear conveyor belts than on any other kind!*

Ask the G.T.M.—Goodyear Technical Man—for a detailed study of your own operation, and further figures on tonnage records set up with Goodyear COAL-FLO belts. Write: Goodyear, Akron 16, Ohio.


THERE'S A COAL-FLO BELT
FOR EVERY COAL HAULAGE JOB
STANDARD COAL-FLO for average-distance hauls in main entries, room entries and rows.
RAYON COAL-FLO for longer distances and higher tensions in mining operations.
STEEL CABLE for extremely long distances and slopes—up to 5-mile centers and single-flight lifts up to 1500'.

Coal-Flo—T. M. The Goodyear Tire & Rubber Company

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

GOODYEAR

THE GREATEST NAME IN RUBBER

6,000 CARS A DAY!

Six thousand cars a day is not an unusual movement through Chesapeake and Ohio's westbound classification yard at Russell, Kentucky. That's *twice* the wartime volume of this mammoth yard. Even before the recent additions, this was one of the largest terminals owned by a single railroad.

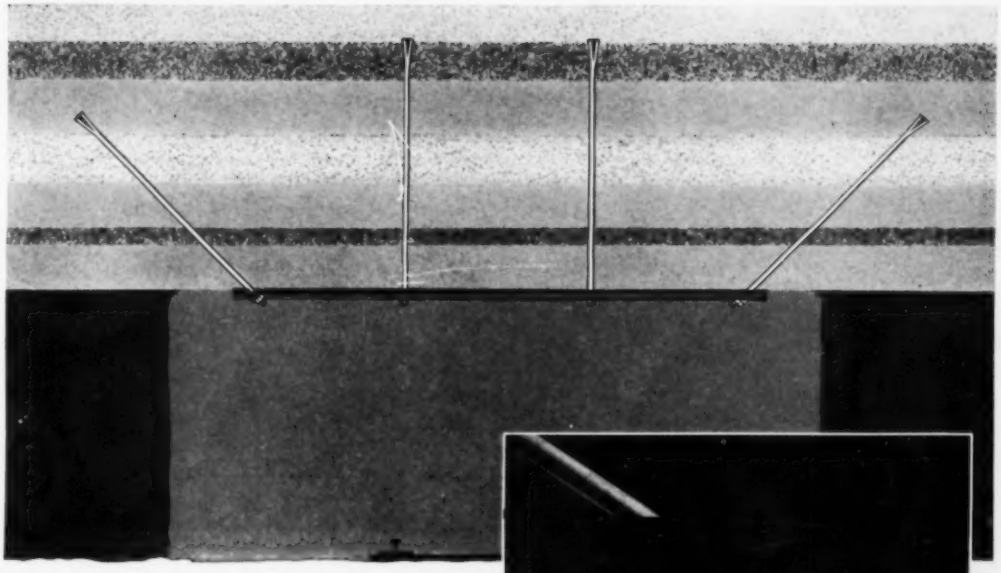
Twenty-six new classification tracks, five new receiving tracks and additional roundhouse stalls for ten more locomotives were added at Russell to handle more cars. More main line and side tracks, together with all the necessary signaling equipment, were installed to handle more trains. Yet this is only one phase of Chesapeake and Ohio's system-wide improvement program to provide better facilities for better service.

This is C&O's "PROGRESS"; this is C&O's determination to better-serve the great coal industry.

C AND O FOR PROGRESS

CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World



One method of using Bethlehem roof ties. Two rods are inserted vertically into the roof strata; two others at 45 deg. Another accepted method, widely used, is to drive all four at 45 deg. In addition to rod-and-wedge sets, Bethlehem can furnish machine or lag bolts for use with expansion sleeves.

Bethlehem roof ties have greater beam strength, pound for pound, than conventional steel channels. The explanation lies in the Bethlehem design. Shown here is a portion of a tie equipped with angle washer, so that the rod may be driven at 45 deg.

BETHLEHEM ROOF TIES

mean greater safety, greater clearance

Here's a type of roof support that's stronger, safer —and at the same time permits greater head and side clearance. That's because it's steel, and takes less space.

Bethlehem all-steel roof ties make it possible, in many cases, to eliminate thick, unwieldy supporting posts and overhead beams. These roof ties are available in Nos. 5, 6, and 9 sections—numbers which correspond to the weight in pounds per foot. They can be supplied in any desired length, though lengths ranging from 9 ft to 18 ft are usually preferred.

The drawing shows one common method of attaching these suspension supports to the roof. In this system, the upper end of each rod is slotted to accommodate a wedge. After a hole has been drilled in the roof, the rod with wedge in place is driven in; as the back of the hole is reached, the wedge is forced deeper into the rod, spreading it and causing a very tight fit against the sides of the hole. At the lower end, when the hole is at 45 deg, the tie is held by an angle washer and nut; otherwise by a plate washer and nut.

If you'd like more details, ask a Bethlehem man. He'll be glad to oblige—and to see that you get prompt delivery of the ties in any lengths you order.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

How to cut loading time and repair costs . . .

SUPERLA MINE LUBRICANTS have reduced loader-clutch repair costs as much as 50% in midwest mines. They have eliminated delays for "warming up" loaders. They have made possible easier and faster loading. Here's why they will assure similar benefits for you:

Superla Mine Lubricants keep transmission cases clean. Clutches operate easily with no gumming or coking caused by oil deposits. When machines are started, these lubricants flow readily between clutch plates, protect them against wear, eliminate "clutch drag" and the necessity for warming up loaders. During long periods of continuous operation, Superla Mine Lubricants do not thin out excessively, provide safer lubrication for clutch plates.

A test of Superla Mine Lubricants will prove their ability to keep your loaders on the job longer with less maintenance. These products are available in oil and grease grades suitable for any type of cutter or loader. A Standard Oil Lubrication Engineer will gladly help you select the proper grades for your equipment.

Write Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY (INDIANA)

SIX GRADES FOR LUBRICATING ANY TYPE OF CUTTER OR LOADER

No. 00 An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases.

No. 0 A high-quality additive-type oil similar to No. 00 but of a slightly heavier grade. It is designed for Goodman loaders and cutters.

No. 2 A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

No. 4 A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

No. 6 A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly useful on mine car wheels and for general underground lubrication.

No. 8 A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure-gun work where a grease of heavy consistency is desired.

STANDARD OIL COMPANY (INDIANA) STANDARD

You always have dependable

VENTILATION WITH Jeffrey

AERODYNE TWIN FANS

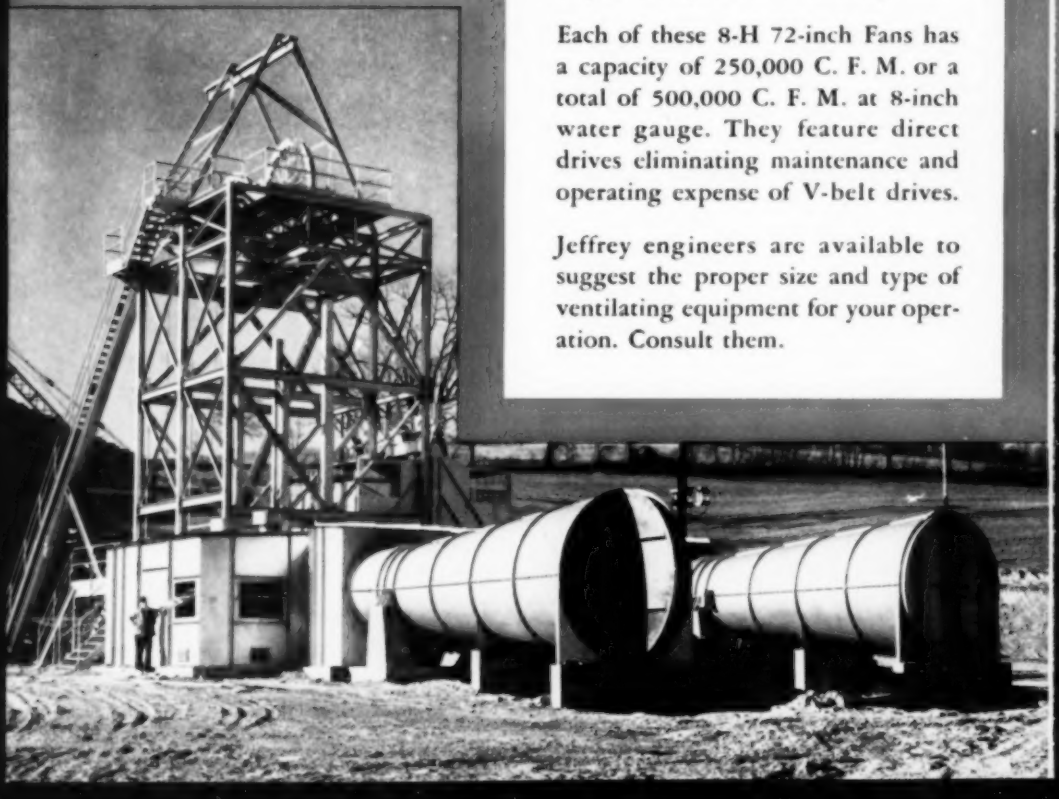
● The use of twin AERODYNE Fans as shown, operating alternately, assures a constant and uninterrupted flow of fresh air underground at all times whether operating one, two or three shifts.

This twin fan set-up provides one unit as a standby—eliminates the chance of operating stoppage in case of mechanical or electrical failure.

One fan is always running—no down time—no lack of fresh air when and where it is needed—no chances taken as you always have a standby unit.

Each of these 8-H 72-inch Fans has a capacity of 250,000 C. F. M. or a total of 500,000 C. F. M. at 8-inch water gauge. They feature direct drives eliminating maintenance and operating expense of V-belt drives.

Jeffrey engineers are available to suggest the proper size and type of ventilating equipment for your operation. Consult them.

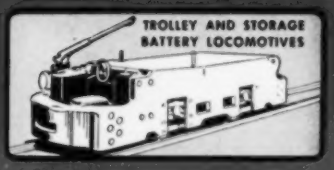


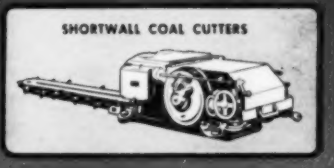
JEFFREY

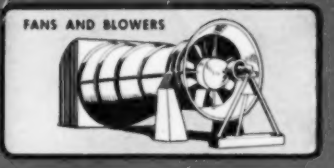
EQUIPMENT FOR COAL MINES

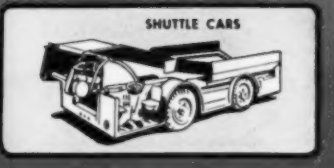
and

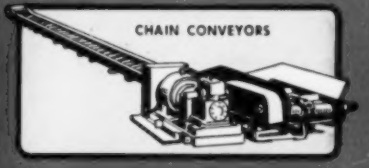
GENUINE RENEWAL PARTS

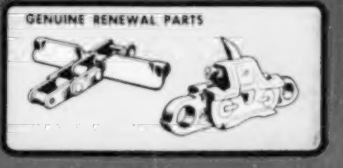












THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

COLUMBUS 16, OHIO, U. S. A.

DISTRICT SALES OFFICES

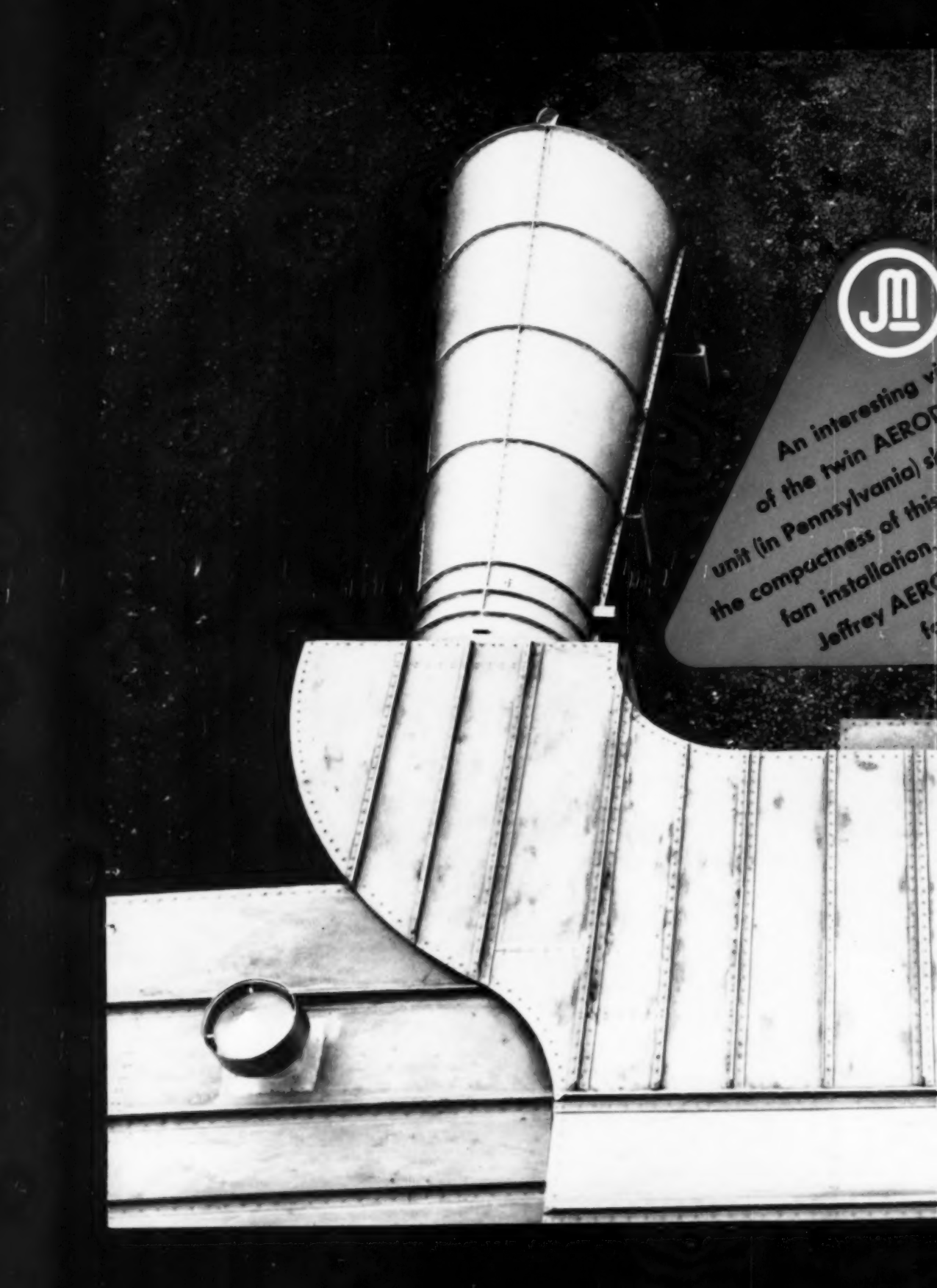
BALTIMORE 2, MD.
Munsey Bldg.
BIRMINGHAM 3,
2210 Third Ave., N.
BOSTON 16,
38 Newbury Street
BUFFALO 2,
Jackson Building
CHICAGO 1,
Bell Building
CINCINNATI 2,
Carew Tower
CLEVELAND 13,
Rockefeller Building
DENVER 2,
Ernest & Cranmer Bldg.
DETROIT 13,
5028 St. Jean Avenue
HARLAN, Kentucky
HOUSTON 5, TEXAS,
3748 Rice Blvd.
HUNTINGTON 11, W. VA.
Guaranty Bank Bldg.
JACKSONVILLE 5,
8114 Forest Park Road
MILWAUKEE 2,
715 N. Water Street
NEW YORK 7,
30 Church Street
PHILADELPHIA 3,
Broad-St. Station Bldg.
PITTSBURGH 22,
Oliver Building
SALT LAKE CITY 1,
101 W. 2nd South St.
ST. LOUIS 1,
Railway Exchange Bldg.
SCRANTON 3,
122 Adams Avenue

SERVICE STATIONS

PITTSBURGH
SCRANTON
BIRMINGHAM
HARLAN, KY.
MT. VERNON, ILL.
LOGAN AND BECKLEY, W. VA.

FOREIGN PLANTS

JEFFREY MANUFACTURING CO. LTD., Montreal, Quebec
BRITISH JEFFREY-DIAMOND LTD., Wakefield, England
JEFFREY-GALION (PTY.) LTD., Johannesburg


An interesting vi
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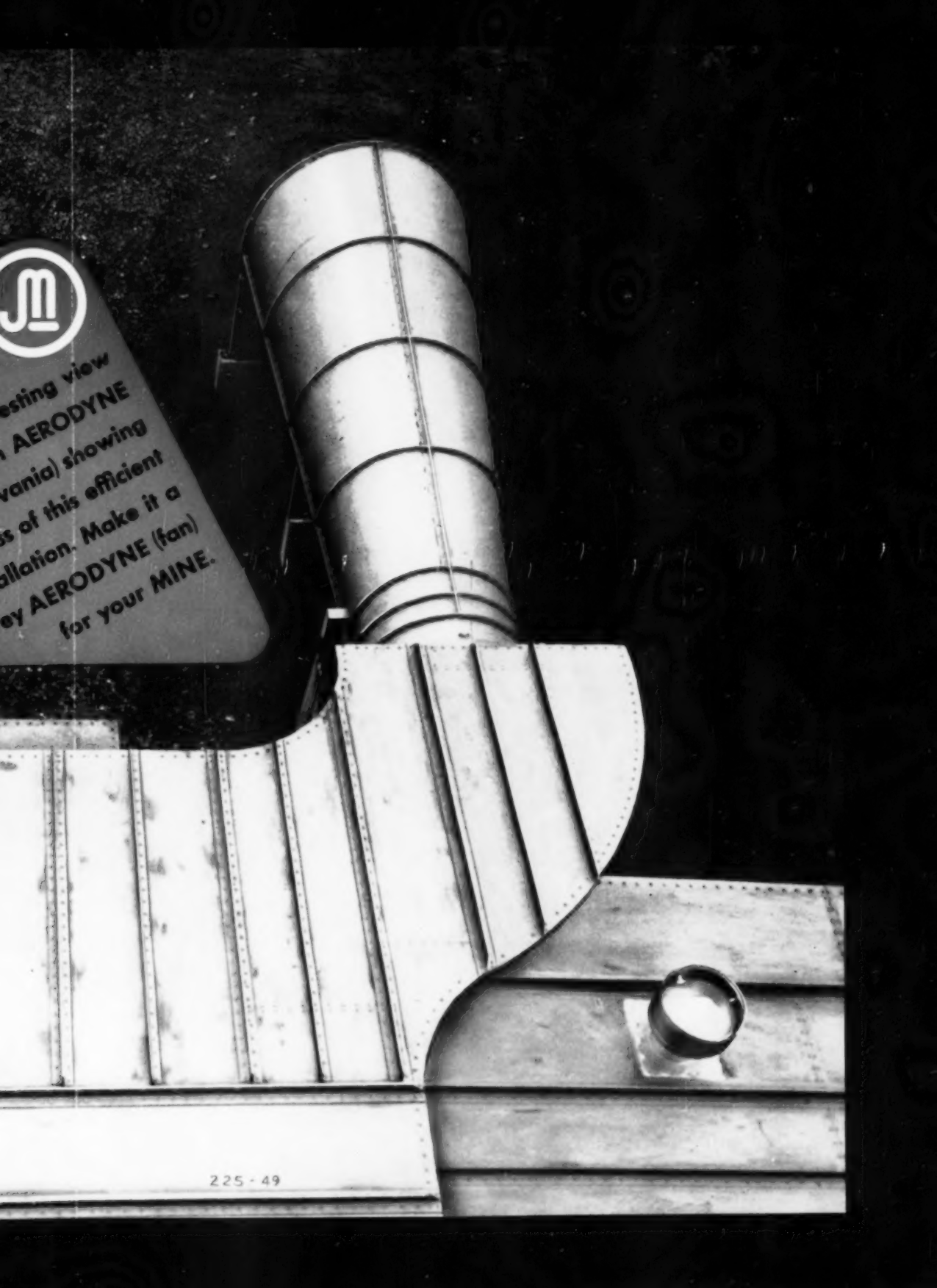
unit (in Pennsylvania) sh
the compactness of this
fan installation.
Jeffrey AERO
fa


esting view
AERODYNE
vania) showing
s of this efficient
allation. Make it a
ey AERODYNE (fan)
for your MINE.
225-49

EVERY contractor knows that profits on a job go up as downtime goes down. You make more money when you meet or beat the deadline.

Firestone tires have cut the downtime on thousands of jobs because they are the toughest tires built . . . because Firestone Service is always on hand to keep them on the job . . . we call it "On-the-Job-Service."

There is a specially built Firestone tire for every off-the-highway job . . . the tough, extra traction Rock Grip for rock work and strip mining; the Ground Grip for traction power in dirt or soft going; the Earth Mover for maximum flotation under big loads on free rolling wheels.

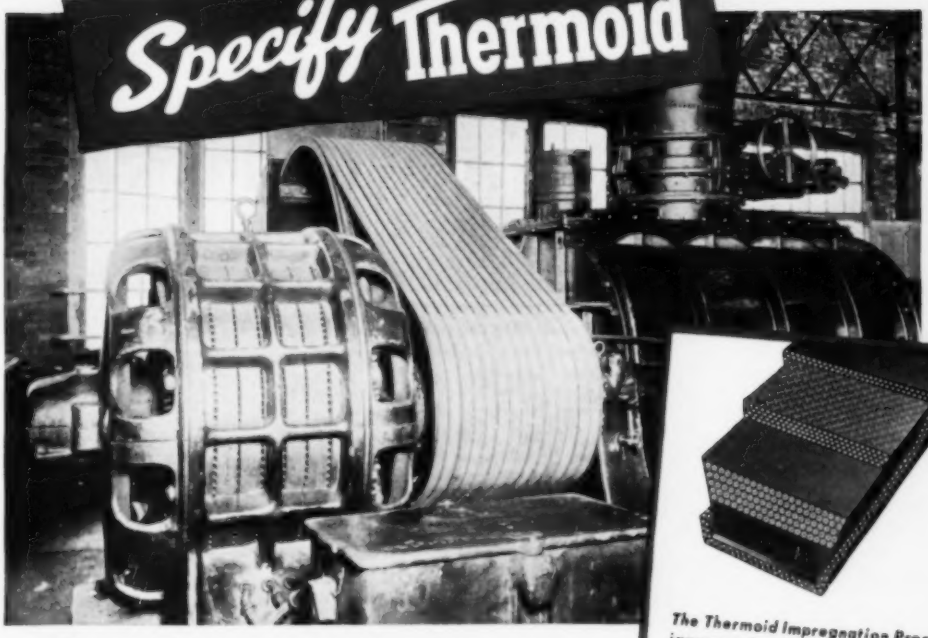
Ask your Firestone Dealer or Firestone Store to give you the complete information on Firestone Off-the-Highway tires. Let him prove to you that he can cut your downtime and increase your profits. When you buy new tires or new equipment, specify Firestone Tires.

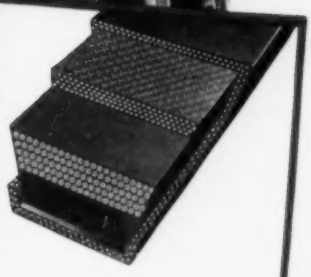
Listen to the Voice of Firestone every Monday evening over NBC

Copyright, 1949, The Firestone Tire & Rubber Co.

FIRESTONE TIRES SAVE TIME . . . SAVE MONEY
Because THEY DO THE JOB
and STAY ON THE JOB

Specify Thermoid





Thermoid Impregnation Process Assures Longer V-Belt Life

Thermoid V-Belts are built to withstand excess moisture—abrasion—acidity—all those elements that hasten belt deterioration. All Thermoid V-Belts are built for the job . . . from the smallest fractional horsepower size up to the largest multiple V-Belt. Each belt is specifically designed and prestretched to transmit maximum power without slippage, to absorb repeated shock loads; and to provide smooth, efficient performance at the *lowest* possible cost per hour.

A complete range of sizes are available to meet your requirements.

For quick service call the nearest Thermoid distributor. Thermoid sales engineers are available for advice on special problems.

It will pay you to *Specify* Thermoid!

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasive action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products

Which of these 7

WILL GIVE YOU BEST ELECTRICAL CABLE

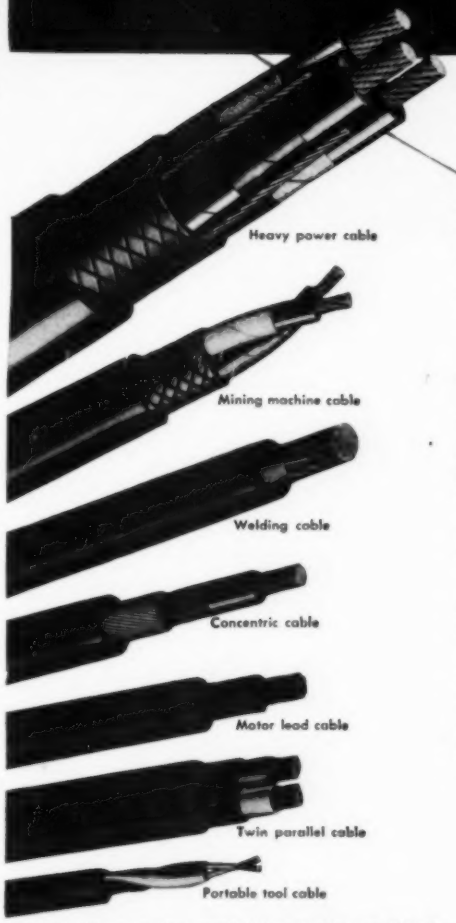
PROPERTIES AND TESTS		REPRESENTATIVE TEST VALUES FOR VARIOUS COMPOUNDS						
		AMARINE —40	AMERZONE —0	AMERZONE —8	AMARINE —RWS	AMERITE	AMPEROX	AMERPRENE
BASIC TYPE OF INSULATION		Natural Rubber	Oil-base	Butyl Rubber	Synthetic Rubber	Commercial 30%	Heat-Resistant	Polychloroprene
MAX. REC. COPPER TEMP.		60°C	75°C	80°C	75°C	60°C	75°C	80°C
ELECTRICAL CHARACTERISTICS	Dielectric Constant (Spec. Ind. Cap.)	4.0	4.0	4.0	4.5	4.5	4.5	....
	Ins. Res. (K)	50,000	7,500	40,000	30,000	30,000	20,000	100
	Dielec. strength in volts per mil	450	350	300	400	400	350	200
PHYSICAL PROPERTIES	Tensile Strength in lbs. per sq. in.	2000	600	700	950	1000 Synth. 1500 Nat.	1000 Synth. 1800 Nat.	2000
	Elongation in 2"	450%	300%	400%	450%	500%	500%	500%
	Permanent set	¼"	½"	⅜"	⅜"	¼"	¼"	¼"
ACCELERATED AGING	Type of test	Geer Oven	Geer Oven	Geer Oven	Oxygen Bomb	Geer Oven	Oxygen Bomb	Geer Oven
	Temperature	70°C	80°C	100°C	80°C	70°C	80°C	80°C
	Hours	288	168	672	168	504	336	168
	% Original Tensile Strength	70%	80%	80%	80%	85%	80%	90%
MOISTURE RESISTANCE	Gain in wt. after 7 days immersion at 70°C (Mg. per sq. in.)	25	....	20 or less	15 or less	35	35	30-60
	Capacity increase after 4 weeks immersion at room temperature	15%	15%	15%	10%	15%	15%	....
	Stability Factor 40-80 volts per mil 2 weeks at 50°C	.5%	1.5%	1.0%	.8%	2.0%	3.5%	....
SPECIAL PROPERTIES		High Voltage and Submarine use	Meets IPCEA ozone test	Withstands .03 conc. 10 hours	For hot and moist locations	General purpose rubber insulation	General purpose rubber insulation	Resistant to oil, flame and ozone

As the test data vary considerably with different sizes of conductor and thicknesses of insulation, these identical results can not be guaranteed throughout the whole range of sizes and voltage ratings. Some specific constructions will test higher and others will test lower than the listed values. However, the above table indicates in general what may be expected of these compounds.

AMERICAN STEEL & WIRE COMPANY

rubber compounds

PERFORMANCE AT THE LEAST COST?



THE proper selection of rubber compounds for electrical cable may mean the difference between long satisfactory service or frequent and costly shut-downs for repairs.

Some rubber compounds will stand more heat than others. Some can be used underground—others can't. The point to remember is this —*no one or two rubber compounds will meet all the conditions encountered in electrical cable operation.* That's why engineers and chemists at American Steel and Wire Company have perfected a wide variety of rubber compounds for different cable applications.

The right combination of compounds will assure better service from electrical cables at lower cost to you.

A GUIDE TO SELECT RUBBER COMPOUNDS

	SPECIFY
FOR UNDERGROUND OR UNDER WATER SERVICE—at high voltages, for all submarine power cables and for general use above 7,500 volts—	AMARINE—40
FOR OZONE-RESISTANCE—Amerzone-0 is an excellent oil-base compound. Amerzone-B is a butyl rubber compound that is highly resistant to heat and moisture as well as ozone.	AMERZONE
HOT OR DAMP LOCATIONS—Select a compound with high moisture resistance and high heat resistance.	AMARINE—RWS
GENERAL USE—For voltages up to 7,500 where copper temperatures do not exceed 60°C (140°F.), a performance type compound is satisfactory.	AMERITE
GENERAL USE with HEAT RESISTANCE—For voltages to 7,500 and where copper temperatures may run up to 75°C. (167°F.).	AMPEROX
FLEXIBLE JACKETS—Where resistance to oil, flame and sunlight is desired a compound containing Neoprene is recommended.	AMERPRENE

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Standard cable construction or special designs of cable are available from American Steel and Wire Company. We make the cable fit the job. This policy assures the longest cable life at lowest cost to the user.

USS

AMERCLAD CABLES

UNITED STATES STEEL

MAKES MORE $ $ $ FOR MORE MINES

than any other kind

The largest selling bits for use with mechanical coal cutting machines are Bowdil Bits. Such popularity is deserved by performance, long life and low cost operation in a growing list of mines throughout the world.

Made of special alloy steel and heat treated by the most modern methods to hardnesses best suited to your cutting conditions, Bowdil Bits are available in special shapes, cutting face contours and clearance angles to fit your needs.

A nearby Bowdil Service Man or Representative will be pleased to give you further information. Write for our latest bulletins on Bowdil Mining products.

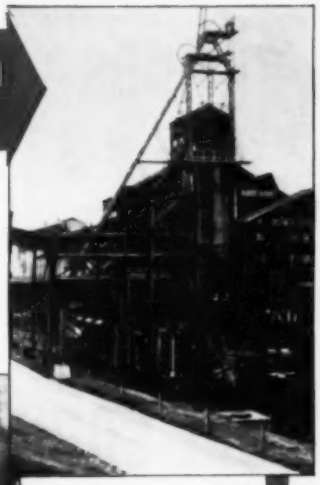
BOWDIL

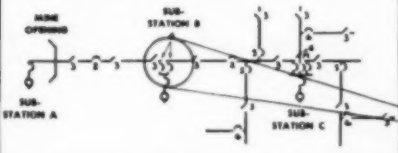
COAL CUTTING EQUIPMENT

CANTON OHIO

How to SECTIONALIZE for HIGHER PRODUCTION
Follow these I-T-E recommendations

One of the surest ways to raise mine production levels is to cut down on time and work lost because of electrical disturbances. I-T-E presents these recommendations to show you how proper applications of I-T-E Sectionalizing Switchgear can pay off for your mine by holding electrical disturbances to an absolute minimum, and by assuring greater safety for personnel and equipment.





THE RECOMMENDED D-C SECTIONALIZING PRACTICES:

Key

1 In each of the following cases, sufficient feeder and return circuit capacity should be provided so that the overcurrent protective device will be opened by a dead short-circuit at the most remote point of the circuit.

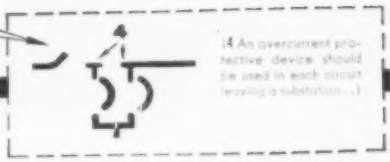
2 An overcurrent protective device should be installed between each two substations at such a point in the circuit that the resistance between each station and the device is approximately the same.

3 A disconnect switch or protective device should be placed at not more than 1,500 ft. intervals in every power line.

4 An overcurrent protective device should be used in each circuit leaving a substation. If automatic reclosing circuit breakers are employed for this, trip-free operating mechanism should be used.

5 An overcurrent protective device should be placed at each main-branch circuit.

6 Each mining setup should be protected by an overcurrent protective device. In some cases, it may be necessary to protect two setups by one device.



●Minimizing electrical disturbances by confining them only to the affected circuits is one of the prime advantages of a properly sectionalized distribution system. By utilizing I-T-E Type KSC Automatic Reclosing Circuit Breakers for the duty above — that of protecting circuits leaving substations — you can safely, effectively confine faults to the line on which they occur.

The KSC operates on circuits which can be fed in either direction; opens quickly at first sign of short or overload — recloses automatically on a return to normal line conditions. And the KSC mechanism is electrically trip-free — it cannot be held closed against a fault. For complete information on the I-T-E Type KSC — the only circuit breaker developed specifically for the mining industry — write for Bulletin 4611.

Find out how you can benefit from proper applications of I-T-E Sectionalizing Switchgear in your mine — consult the I-T-E Mining Specialist in your locality. He thoroughly understands the Bureau of Mines' new recommendations for installing and using electrical equipment in coal mines, and is fully qualified to assist and advise you in planning the sectionalization of your distribution system. Use his services without obligation.

Be Production-Wise . . . Sectionalize!

S-E-C-T-I-O-N-A-L-I-Z-I-N-G
SWITCHGEAR

I-T-E CIRCUIT BREAKER CO., 19TH & HAMILTON STREETS, PHILADELPHIA 30, PA.
31 OFFICES IN THE UNITED STATES • In Canada, EASTERN POWER DEVICES, LTD., TORONTO

SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS

Choose from America's

most complete line of trucks

for these 4 reasons

1 **International Trucks are specialized** for the job. International builds America's most complete line of trucks. It offers 22 basic models, 1,000 truck combinations ranging in gross vehicle weights from 4,400 to 90,000 pounds. It also offers 13 truck engines (gasoline, diesel, butane) as well as specialized units and parts, to satisfy individual hauling requirements. An International sales engineer who knows your business in terms of trucks helps you analyze your own hauling needs and select the right International Trucks to meet them.

2 **For the 17th straight year** International Trucks lead in heavy-duty sales. The country's most exacting truck buyers are the men who buy trucks of 16,001 pounds GVW and over. Their vote of confidence in Internationals is based on truck value—the same truck value found in every International . . . light, medium, and heavy-duty.

3 **More than half of all International Trucks** ever built—in 42 years—are still at work. International has been building rugged trucks uncompromised by passenger car design or construction since 1907. International Trucks are built to last—and they do.

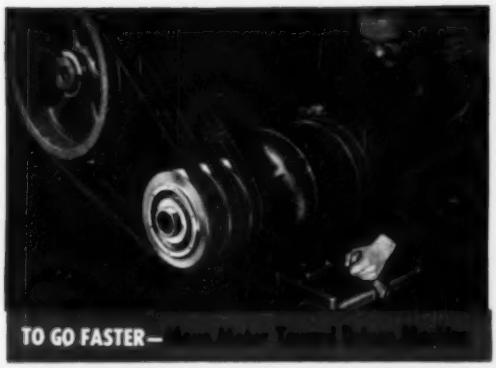
4 **International Trucks are backed** by America's largest exclusive truck service organization. 4,700 Dealers and 170 Company-owned Branches offer complete International Truck service wherever you drive a truck. Precision-engineered replacement parts, factory-rebuilt exchange units, and factory-trained mechanics are as close as your telephone. For the right truck to solve your hauling problems, see your nearest International Dealer or Branch.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars," NBC, Sunday afternoons

INTERNATIONAL INTERNATIONAL **TRUCKS**

INTERNATIONAL HARVESTER COMPANY • CHICAGO



TO GO FASTER—

TO GO SLOWER—

ONE HAND DOES IT—

TEXROPE *offers Instant, Low Cost Way to*

Control Machine Speed

- Covers most speed changing applications from 1½ to 40 hp.
- Very simple — one sheave does everything automatically.
- Infinitely variable speed—100% increase; 2 to 1 range.

NOW YOU CAN HAVE all the advantages of instant speed control on all your machines at very low cost and without installing intricate and expensive mechanisms. You can increase production by setting operating speeds at exactly the right tempo for highest production. You can improve quality, change to new materials, all at the twist of a wrist.

All this is made possible by the *new Vari-Pitch* Automatic Sheave which changes pitch diameter and holds proper belt tension *automatically*. Today, ask your A-C Authorized Dealer or Sales Office to give you complete facts and figures on how the new *Vari-Pitch* Automatic Sheave can save money in your operations. Or write for Bulletin 20B7223. A-2837

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
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by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

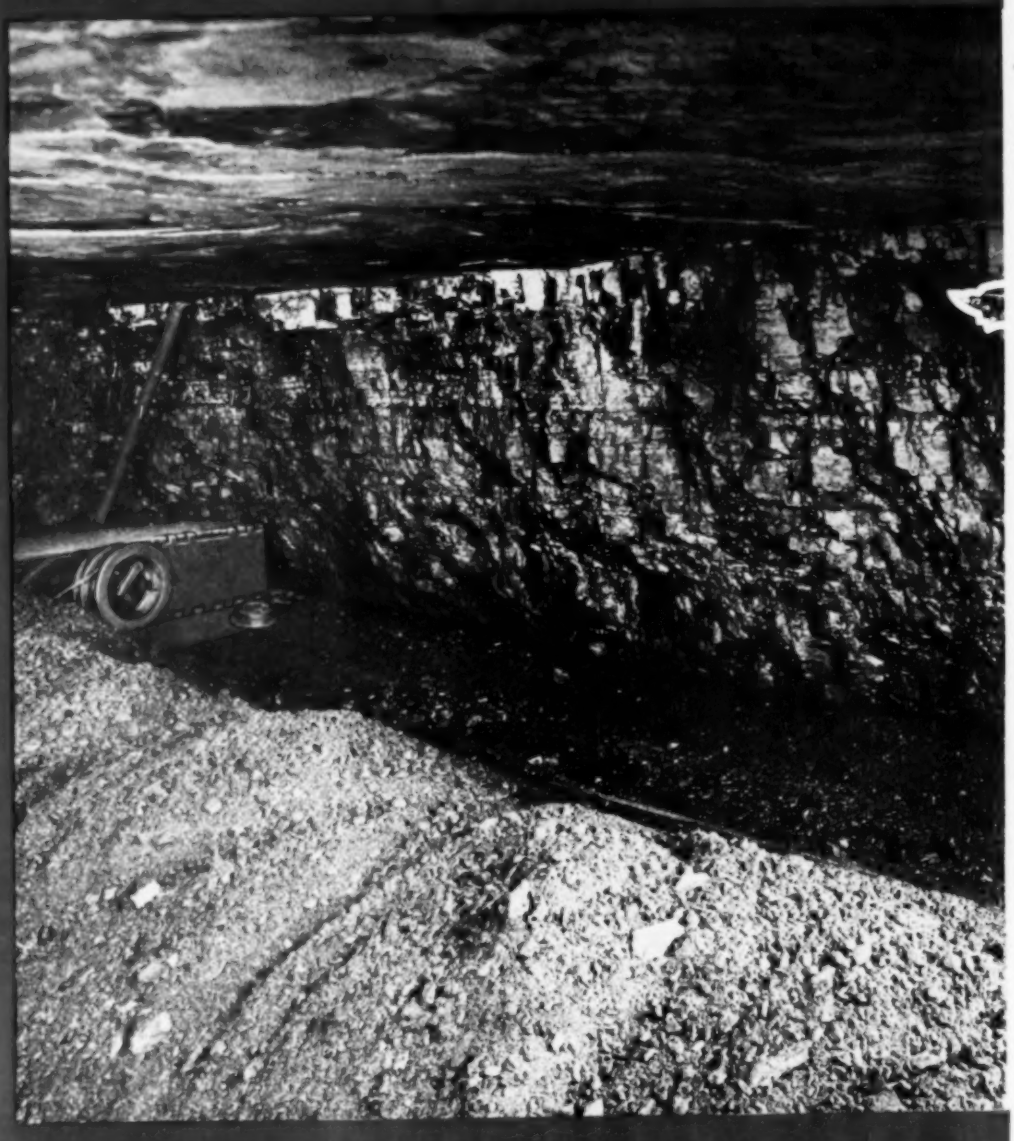
MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

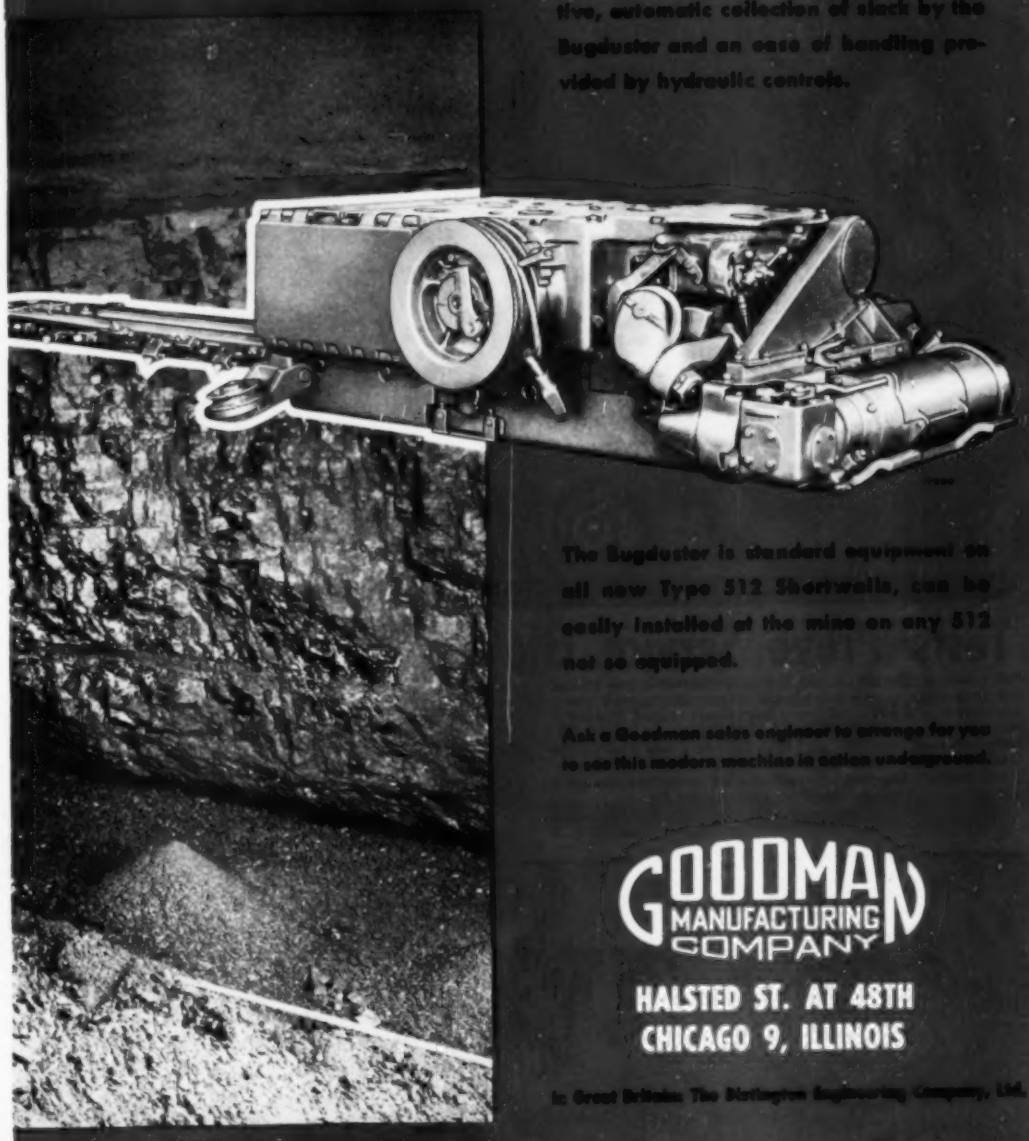
ALLIS-CHALMERS

The GOODMAN TYPE



512 SHORTWALL*

. . . a fast cutting machine with a positive, automatic collection of slack by the Bugduster and an ease of handling provided by hydraulic controls.



The Bugduster is standard equipment on all new Type 512 Shortwalls, can be easily installed at the mine on any 512 not so equipped.

Ask a Goodman sales engineer to arrange for you to see this modern machine in action underground.

GOODMAN MANUFACTURING COMPANY

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CHICAGO 9, ILLINOIS

In Great Britain: The Distington Engineering Company, Ltd.

Now! When You Order Forget

Tests Prove Service Life of Tuffy is Greater

"After moving 1,234,000 cu. yds., the superintendent is very pleased with Tuffy Draglines, especially because they are digging back from a very steep slope in a 70 ft. hole under tough abrasive action. On basis of this performance, another set of 2½", 280 ' Tuffys, a set of 2", 225 ' Tuffys and a 2¼", 216 ' and 2⅛", 224 ' Tuffy for a twin drag machine have been ordered to replace competitive ropes."

"Tuffy Dragline's ruggedness gave well over 300 percent improvement in performance plus considerable time saved changing lines."

From all parts of the country, replies such as these verified the claims made by Union Wire Rope engineering specialists who designed Tuffy Draglines. In-the-field tests were made under severe operating conditions where Tuffy handled many types of material on different equipment. Tuffy's extra flexibility, abrasive resistance and stamina were challenged in digging, casting, and loading operations. Yet results of the tests were the same in all cases: Longer Life, Better Performance, Greater Economy.

Tuffy is a special rope for any and all dragline jobs. It is designed by the same specialists who have made hundreds of other Union Wire Rope products the standard of quality in the construction field.

UNION WIRE ROPE CORP

union Wire Rope

DRAGLINES... Everything Except

the NAME Tuffy

the SIZE ?inch

the LENGTH ?feet

Just These 3 Specifications

Tuffy... Size... Length—that's all you order to get the RIGHT dragline for your particular job. No more confusing specifications, only to end up with a rope that is restricted to use under limited operating conditions. Now—in one simplified order—you get Tuffy Draglines designed to give maximum performance in *all* operations.

Always specify Tuffy when you order. (Example: 225' 1¾" "Tuffy" Dragline). Mail coupon today for illustrated folder.

Tuffy DRAGLINES

are Built Tough to Meet all Operating Conditions

Extra flexibility and maximum abrasive resistance are built into Tuffy Draglines to assure dependable performance on any type of equipment—handling any type of material. Wet and dry dirt, sand, rock, gravel, cement, minerals, all give way to Tuffy's structurally tough construction. At high speeds or low speeds, Tuffy Draglines give top operating efficiency; they hold securely to drum when casting, ride better on grooves and are easier and safer to use. Put Tuffy to the test! He's built tough!

UNION WIRE ROPE CORPORATION

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☐ Send Complete Illustrated Folder on Tuffy Draglines.

For Tuffy Draglines — See Your Union Wire Rope Distributor (Listed in Yellow Section of Your Telephone Directory) and or Send This Coupon.

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ADDRESS .....

CITY ..... ZONE .....

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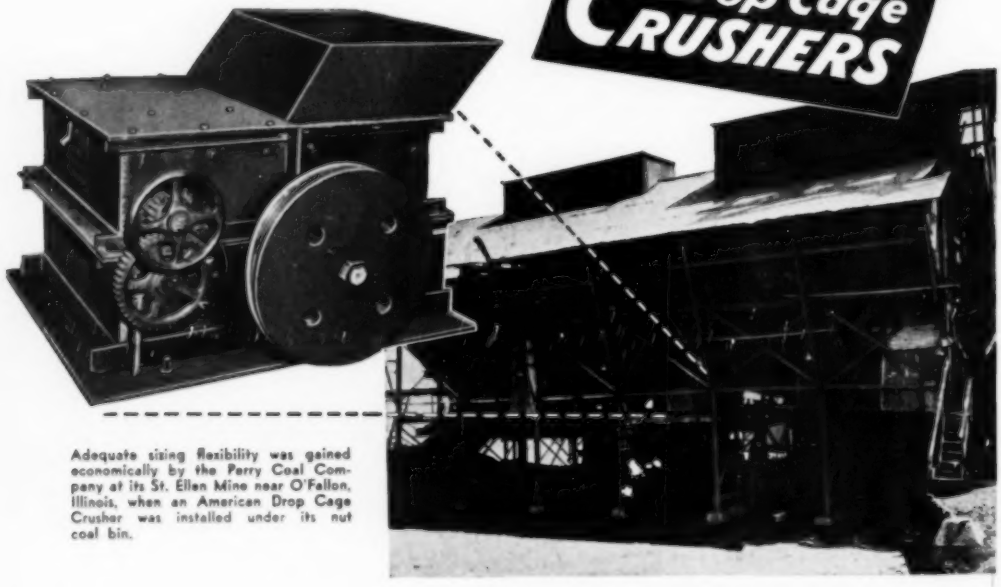
GET FLEXIBILITY of SIZING plus UNIFORM HIGH TONNAGE

install AMERICAN Drop Cage CRUSHERS



Adequate sizing flexibility was gained economically by the Perry Coal Company at its St. Ellen Mine near O'Fallon, Illinois, when an American Drop Cage Crusher was installed under its nut coal bin.

Rapidly fluctuating market needs is no problem to operators where flexible American Drop Cage Rolling Ring Crushers are on the job. They're designed especially for the secondary step in the full range of reduction to add flexibility to coal preparation.

EASY, ECONOMICAL TO INSTALL—Compact Americans are engineered to occupy the smallest possible space, right under the bin, with extremely low headroom requirements including by-pass—assuring minimum installation costs without extensive preparation plant alterations.

HIGH TONNAGE — LOW OPERATING COST—Doubly adjustable for flexibility of sizing to meet each day's market conditions, American Ring Crushers reduce coal through cleavage instead of blunt shattering force, giving a controlled ratio of fines—high tonnage output of uniform marketable sizes. And, by reducing at low, power-saving speeds, Americans offer additional savings in operating costs.

With capacities from 50 to 500 TPH, there's a type and size of American that's custom-built to make your coal marketing more flexible, more profitable.

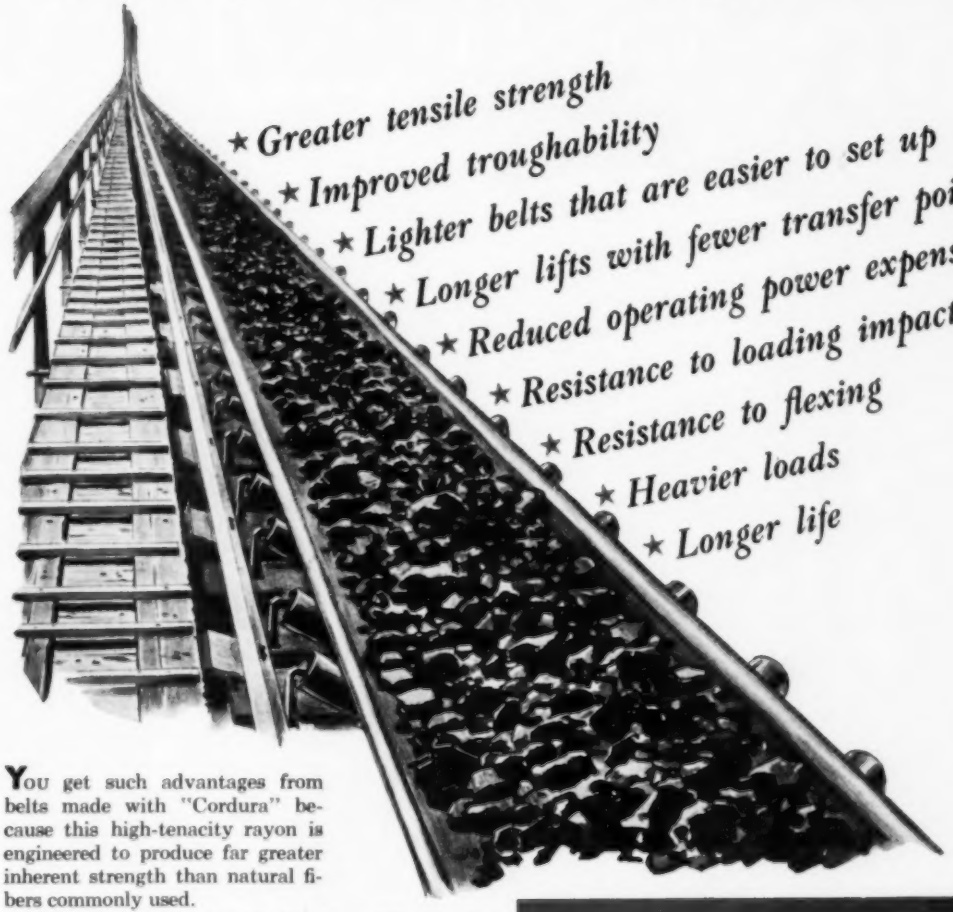
Get the facts—send for Coal Crushing Bulletin.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

Here's how Du Pont Cordura* Rayon can improve your conveyor belt performance



★ *Greater tensile strength*
★ *Improved troughability*
★ *Lighter belts that are easier to set up*
★ *Longer lifts with fewer transfer points*
★ *Reduced operating power expense*
★ *Resistance to loading impacts*
★ *Resistance to flexing*
★ *Heavier loads*
★ *Longer life*

You get such advantages from belts made with "Cordura" because this high-tenacity rayon is engineered to produce far greater inherent strength than natural fibers commonly used.

A carcass reinforced with Du Pont "Cordura" Rayon makes possible a thinner, lighter belt that's easier to work with. And "Cordura" packs tensile strength into long-lift belts—yet provides outstanding troughability.

Du Pont "Cordura" High Tenacity Rayon means better belt performance and greater economy. Next time you need a conveyor belt, ask your supplier for a belt that's sinewed with "Cordura." And write today for more information on the use of "Cordura" in conveyor belts. Address Room 4727, Rayon Division, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

DU PONT "CORDURA" HIGH TENACITY RAYON

DU PONT

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For RAYON...for NYLON...for FIBERS to come...look to DU PONT

THE NEW

Edison

25% More Light

Positive "Spot" Adjustment

Highest Beam Candlepower

Tough Nylon Plastic Battery Container

Nickel-Iron-Alkaline Edison Battery

First and Foremost

with dependable, effective light for the miner!

Model R-4 Electric Cap Lamp

The latest and finest development of the world-famous EDISON Electric Cap Lamp is *the new R-4 that gives you more!*

More light... even greater dependability... increased effectiveness...enhanced durability—all are yours in Model R-4, new from headpiece to battery case, for finer safety and better mining efficiency.

Let us prove to you how R-4's many extra advantages can benefit your own operation. We'll gladly arrange an on-the-job demonstration—write!

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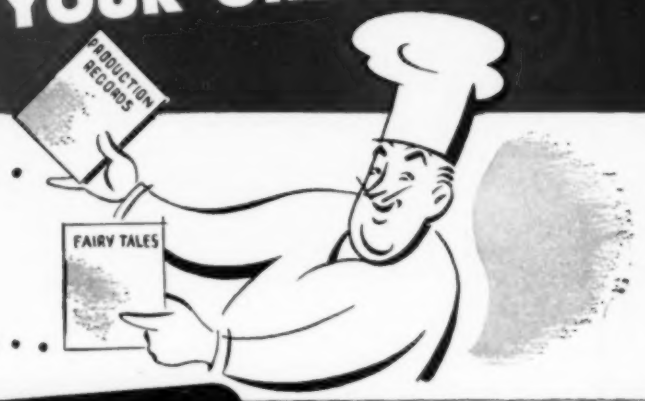
WHAT'S YOUR ORDER?

facts.....
or
fiction....



WHY "KID" OURSELVES... OR *YOU?*

Let's not fool anybody! Screening is the major problem in the industry, and, these days, multiplied efficiency in any mechanical operation is one of the few places where alert management can reflect itself on the right side of the profit and loss statement. B-Z records show cases where these stainless - steel, precision - welded Round-Rod Screens outlasted those in previous use by 30-to-1 . . . served 5 years on jobs where other screens were "honorably retired" after half a year.

WE CAN DO BETTER

We *said* "Let's not fool anybody." We're not kidding ourselves either. B-Z can not guarantee, in every case, 30 times the life of the screens you are now using. BUT — we make you this proposition: Let us look over your screen uses and recommend the B-Z screens *we* think will profit you. Then *you* decide, in terms of dollars and cents, based on your own operation. Write for new catalog describing some of the many successful B-Z installations. No obligation.

BEE ZEE

BIXBY-ZIMMER ENGINEERING CO.

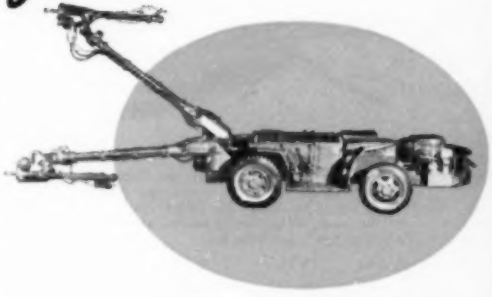
DEPT. 110, 961 ABINGDON STREET, GALESBURG, ILLINOIS

Meet any drilling condition instantly with the FAST, MOBILE

JOY CD-25 COAL DRILL

Check these operating advantages

- ✓ INFINITELY VARIABLE ROTATION SPEED, hydraulically operated—an exclusive JOY feature. You can increase feed independent of rotation for soft spots, or increase rotation independent of feed when the drilling gets tough.
- ✓ COMPLETELY HYDRAULICALLY CONTROLLED—with all controls centrally located for safe, easy one-man operation.
- ✓ TRACKLESS, SELF-PROPELLED, FAST-TRAMMING—will cut down over-all drilling time and keep ahead of any loader.
- ✓ ONLY 36 INCHES HIGH—for work in all but the thinnest seams. Drills 9-ft. holes anywhere from 6 inches to 5½ feet above the floor.



The JOY CD-26, a twin-boom hydraulic drill. High-powered for heavy-duty drilling—can handle large Airdox holes.

WRITE FOR BULLETIN, OR

Consult a Joy Engineer

W&D CL 2411

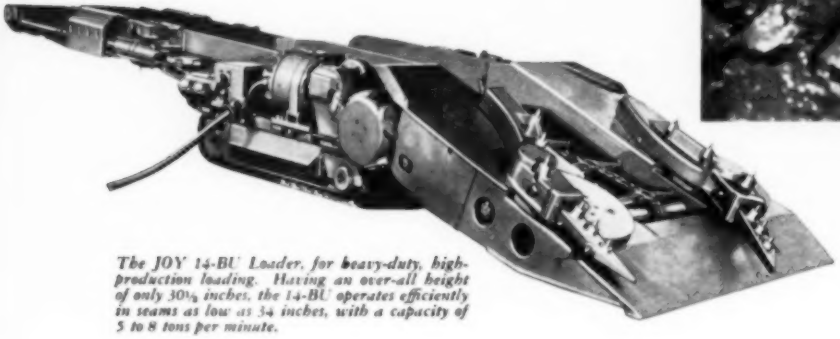
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

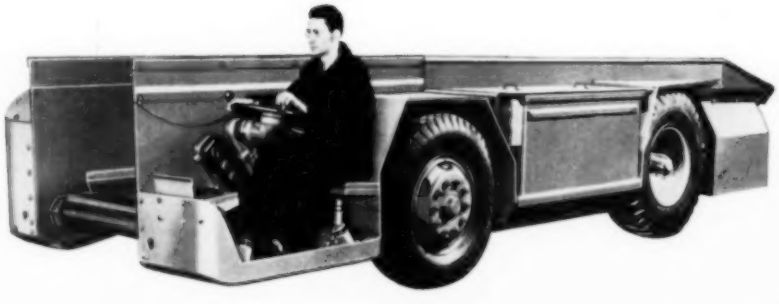
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

JOY LOADS COAL FASTER!

JOY, the *pioneer* in modern methods of high-production trackless mining, builds compact, highly efficient machines for every mining condition. • Let us help *you* to increase tonnage and reduce costs...
WRITE FOR INFORMATION.



The JOY 14-BU Loader, for heavy-duty, high-production loading. Having an over-all height of only 30½ inches, the 14-BU operates efficiently in seams as low as 34 inches, with a capacity of 5 to 8 tons per minute.



The JOY 42-D Shuttle Car, for fast, high-tonnage moving in medium seams. Available either battery-powered or by hydraulically-controlled cable reel, and with a hydraulic adjustable elevated discharge, if desired.

For higher tonnage and lower costs

Consult a Joy Engineer

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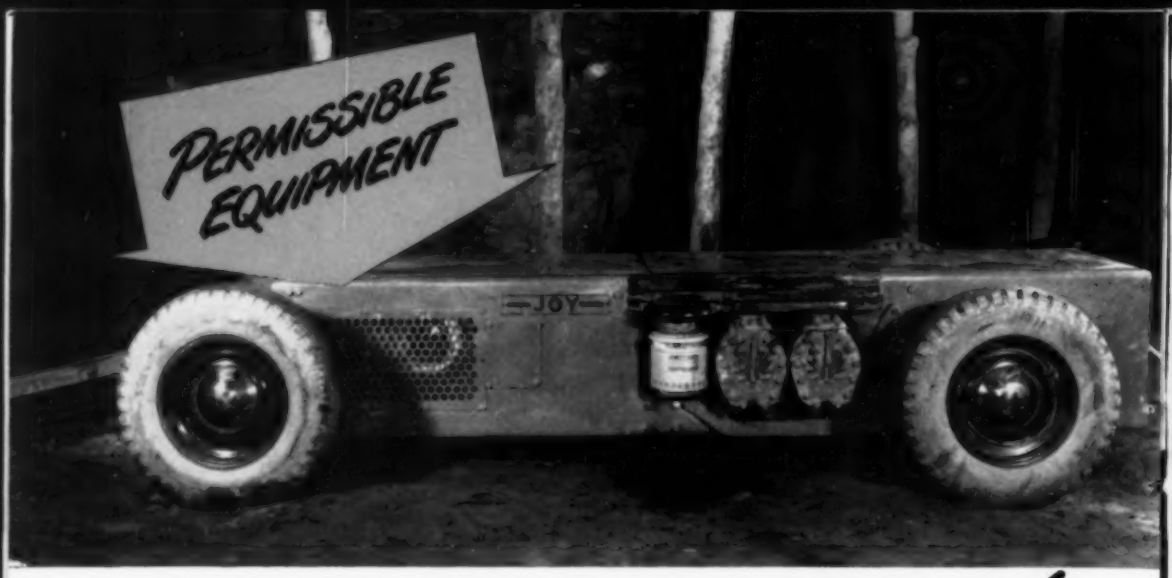

ROOF-BOLTING TEAM!

JOY MINE-AIR COMPRESSORS and STOPERS

Check these Advantages!

★ JOY COMPRESSORS . . . B of M-approved, and less than 50" high. Rubber tire and track models, either self-propelled or draw-bar types. Two sizes: 130 or 175 CFM at 115 PSI. Compressors are two-stage, single acting, air-cooled—highly efficient and reliable.

★ JOY STOPERS . . . Complete line down to 21" high for roof-bolting applications. These stopers do the entire job: drill the hole, drive the bolt and wedge—and as an *exclusive* feature, have a built-in torque wrench for tightening the nut.

50 YEARS of COMPRESSOR and DRILL-BUILDING EXPERIENCE

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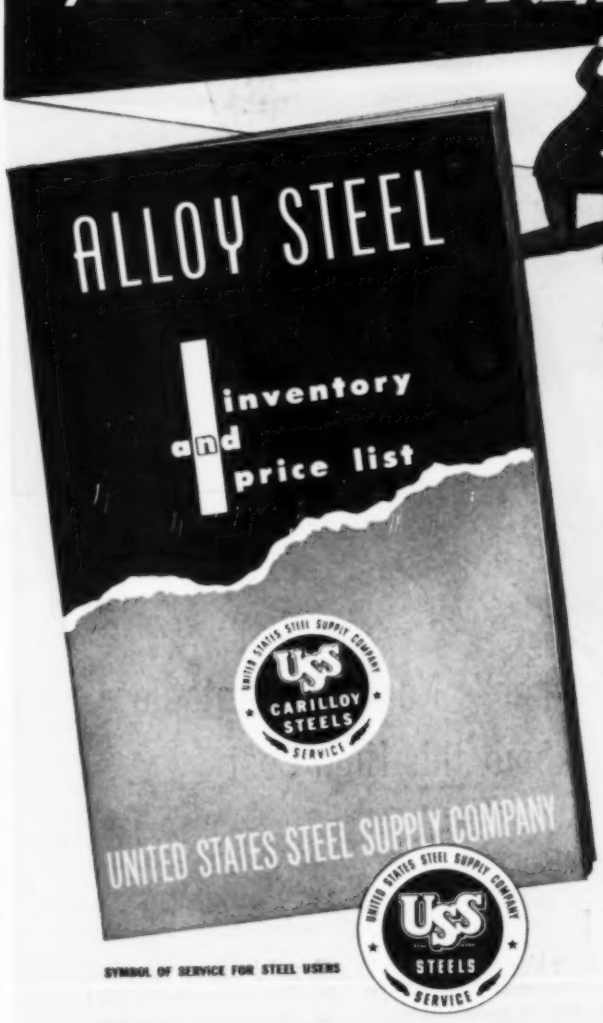
If you use Alloy Steels, you'll need this *FREE BOOK!*



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HERE's a handy booklet which gives you quick answers to a lot of questions on both commercial and aircraft quality alloy steels.

Do you want to know what grade to order?
This booklet tells you.

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All you have to do is check the comprehensive information contained in the listings.

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Send for your free copy of this valuable, informative, and time-saving Inventory and Price List. Just fill in and return the convenient coupon. Do it right away.

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Without obligation on my part, please send me a FREE copy of your handy booklet, "Alloy Steel Inventory and Price List."

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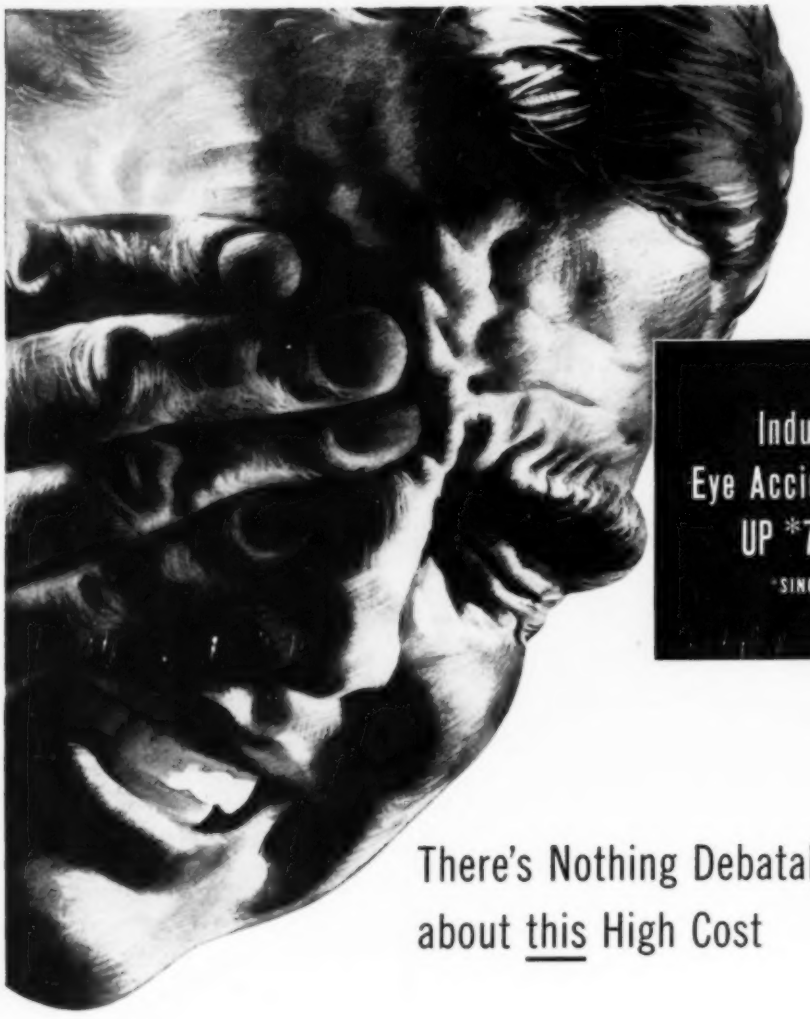

Industrial
Eye Accident Costs
UP *78 ½%
*SINCE 1939

There's Nothing Debatable
about this High Cost

...it can be cut!!

Many high costs are "sacred cows" that resist correction, but high eye accident costs have *no sponsor!* They can be cut now—and the savings may be amazing. A goggle costing $2.30, approximately, has saved claims in four figures, has kept a skilled operator (instead of a substitute) on the job, has kept output up, rejects down.

The facts about an adequate eye protection program that can prevent 98%* of all eye injuries, are yours for the asking. An MSA Representative will be glad to call without obligation on your part. He's near you—call him today.

*98% of industrial eye accidents are preventable when shop workers wear safety goggles according to the Society for the Prevention of Blindness.

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SAFETY
DEPENDABILITY
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YOU GET ALL THREE
IN THE NEW——
SIMPLEX-TIREX
SHUTTLE CAR CABLE

... and all three add up to
BIGGER PROFITS for you.

YOU GET SAFETY. Insulation over the conductors combines electrical stability with mechanical toughness to withstand the rigors of shuttle car service... The jacket of Selenium Neoprene Armor is flame resistant and bears approval No. P-101 of the Department of Mines, Commonwealth of Pennsylvania.

YOU GET DEPENDABILITY. New and exclusive GEAR-SHAPED insulated conductors firmly interlock with the jacket so that even continual twisting of the cable cannot pull them out of position. They will not twist, will not override each other... The Selenium Neoprene jacket is CURED-IN-LEAD for added toughness and will stand up under crushing and runovers and exposure to water, acids, grease, oil, and heat.

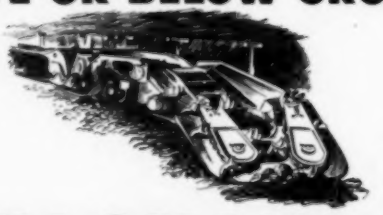
YOU GET ECONOMY. Safe, dependable operation assures long, trouble-free cable life—means low maintenance costs, infrequent replacements, less down time per machine ... Simplex-TIREX Shuttle Car Cables are small in diameter, light in weight; are quickly and easily installed. Their flat construction allows more cable per reel; increases the serviceability of each machine.

For complete information and specification data contact the Simplex representative in your area or write us direct for Folder 1007.

SIMPLEX-TIREX

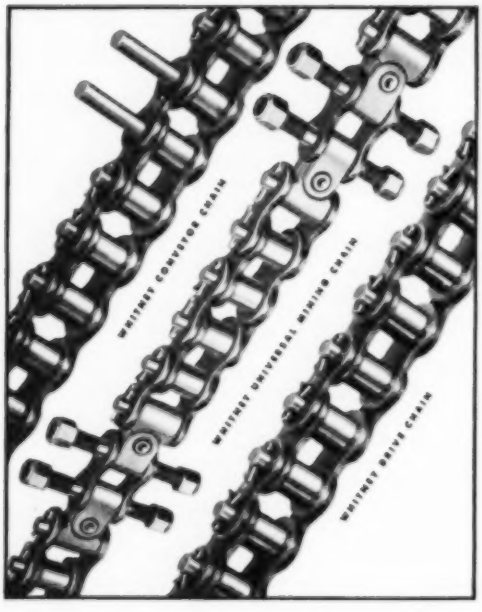
SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

ABOVE OR BELOW GROUND



WHITNEY CHAIN DRIVES

are tonnage producers



Whitney chain . . . loader, conveyor or drive . . . is one investment that will pay out daily profits.

Made of selected heat-treated alloy steel, these tough, rugged chains keep equipment producing on schedule. They stand up under the severest of operating conditions . . . resisting shock loads without breakage. Whitney Chain Drives help give you lowest cost-per-ton production wherever they are used . . . in the preparation plant or up-at-the-face.

Accurately designed Whitney Cut Tooth Sprockets complete the combination for overall drive efficiency. Like Whitney Chains they are made to insure smooth operation and give long wearing life.

Standardize on Whitney Chains and Cut Tooth Sprockets . . . the all-steel drives . . . and you'll get greater output and less down time.

THE WHITNEY CHAIN & MFG. COMPANY

Division of Whitney-Hanson Industries, Inc.

210 Hamilton St., HARTFORD 2, CONNECTICUT

How to simplify lubricant storage and handling:

use { Gulf Mining Machine Lubricant B
for lubrication - it does the job of 2 or 3 other lubricants

Gulf Journal Oil B
for hydraulic systems

With Gulf Mining Machine Lubricant B and Gulf Journal Oil B you can service almost any mining machine—and you eliminate as many as 4 oils and greases! Thus your lubricant storage and handling are greatly simplified and you avoid application errors at the face.

Gulf Mining Lubricant B and Gulf Journal Oil B not only do the job of several other oils and greases, but do it better! Gulf Mining Machine Lubricant B has a heavy body to insure less leakage from gear cases; exceptional adhesiveness that prevents throwoff or channeling; higher lubricating value that insures less wear; and it resists the washing action of water.

Gulf Journal Oil B gives outstanding protection to hydraulic pumps—helps maintain system efficiency!

Call in a Gulf Lubrication Engineer today and ask him to explain in detail how these two Gulf quality products for cutting and loading machines can give you effective help in your efforts to increase tonnage and reduce costs. Write, wire, or phone your nearest Gulf Office.

Gulf makes available top quality passenger and truck tires — ask your Gulf representative

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices: Boston · New York · Philadelphia · Pittsburgh
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GULF INDUSTRIAL LUBRICATION

HERE'S THE COUPLER YOU NEED

to make your mine car modernization complete

O-B Automatic Couplers installed on a large drop-bottom mine car. Ideally suited for drop-bottom cars, O-B Form-S Couplers and Anchorages can be mounted entirely on the outside of the car.

Photographs Courtesy of Stanford-Day Iron Works, Inc.

INVESTIGATE THESE *Five Reasons*

Why O-B Automatic Couplers Will Help You Haul More Coal for Less Money!

1. LESS MAINTENANCE Removing from 12 to 15 feet of dead slack from every trip, O-B Couplers eliminate the damaging impacts and distorting side strains which increase in severity with the weight of the car. Less maintenance is required. Coupler-equipped cars spend little time in the repair shop; they stay on the job hauling coal.

2. GREATER SAFETY With O-B Couplers, workmen need not go between the cars to manipulate treacherous hitchings. Neither must they align the coupler heads to assure a positive connection. O-B's enclosed self-centering device brings coupler heads to center position, and a wide gathering range permits coupling on all normal curves without manual adjustment.

3. FASTER OPERATION More coal can be handled faster with O-B Automatic Couplers. Saving time at loading, gathering and dumping points, coupler-equipped cars spend more time "on the go"... make more trips per day. A rotary coupler head makes uncoupling unnecessary at rotary dumps—another "time-saver."

4. MORE PAY LOAD O-B Couplers give the coal a "sleeper ride." Jolting and banging is minimized. All coal loaded at the face reaches the tipple. In addition, the haulageway stays free of spilled coal... eliminates periodic clean-ups.

5. INCREASED TRACK STABILITY Rigid steel-beam connections keep the cars in line... cut down derailments. The elimination of dead slack promotes a more even distribution of stresses and prevents bumper-to-bumper impacts. An ingenious rubber draft gear arrangement on the Form-8 Coupler affords a 100,000-lb. capacity and actually exerts pressure which holds the cars in the center of the track.

Because of these five basic advantages, O-B Automatic Couplers can improve the operation of your entire haulage system. Why not complete your mine car modernization by installing O-B Couplers? Specify them on your next major purchase of new cars. Once you've tried them, you'll never again want to go back to old-fashioned links and pins.

3022—AM

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

NO CABLE LIKE IT!

SECURITYFLEX

PARALLEL MINE CABLE

with BREAKER-STRIP*

SECURITYFLEX *Safety Firsts*

- ***First*** **to comply with U. S. Bureau of Mines Flame Test and Pennsylvania Flame Test. (Insist on mark of *full compliance*—P-102-BM—at 12′ intervals.)**
- ***First*** **and *only* Anti-Short Breaker Strip* construction — cuts short circuits between conductors.**
- ***First*** **parallel mine cable with ground wire.**
- ***First*** **and *only* D-Shaped* insulation — prevents overriding of conductors.**
- ***First*** **to have insulation and outer jacket bonded together — to form a *solid block* around conductors.**
- ***First*** **with smaller diameters that pack more on a reel, ease handling.**

*Reg. U. S. Pat. Off.

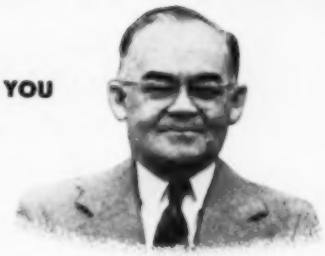
THE PATENTED anti-short breaker-strip construction of Securityflex Parallel Mine Cable is an exclusive development of Anaconda Wire & Cable Company. No other mine cable gives you this protection against shorts between conductors, even under the heaviest impact.

Breaker-Strip (available with or without ground wire) is only one of the many Securityflex features. Add up the advantages of Anaconda's specially compounded, extra tough neoprene jacket . . . non-kinking construction . . . improved heat-resisting synthetic rubber insulation . . . superior manufacturing techniques . . . the *Safety Firsts*.

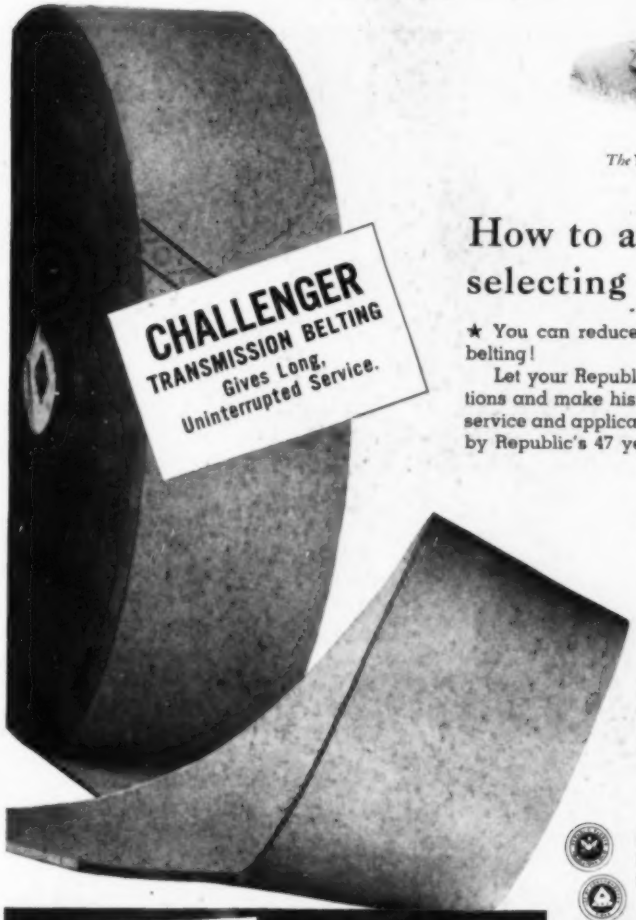
Call your local Anaconda distributor (located in all principal cities) about Securityflex—the cable that takes a beating *and likes it!* Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

ANACONDA *Securityflex* **MINE CABLE** ANACONDA

HERE'S WHAT REPUBLIC DISTRIBUTORS DO FOR YOU



W. F. Burr, President
The Youngstown Rubber Products Co.
Youngstown, Ohio



How to avoid high costs when selecting transmission belting

★ You can reduce the operating cost of your transmission belting!

Let your Republic Rubber distributor analyze your operations and make his recommendations. His experience in the service and application of Mechanical Rubber Goods, backed by Republic's 47 years of quality production, may lead him to recommend CHALLENGER belting. Perhaps, from Republic's many different brands, he will select another grade of transmission belting designed to give you lowest operating costs on your particular drive—to save you money.

There's a national network of Republic Rubber distributors. Like The Youngstown Rubber Products Company, they help you reduce belting costs. To obtain the name of the Republic Rubber distributor in your city, consult your telephone directory, use the coupon or write direct.

Endless transmission belts are an important part of Republic's complete line. Pictured here is the Cameron Slitting Machine cutting friction fabric rolls into belt width strips.

REPUBLIC RUBBER DIVISION
Lee Rubber & Tire Corporation, Youngstown, Ohio
Lee Deluxe Tires & Tubes — Conshohocken, Pa.

Pioneers in the use of COLD RUBBER

MECHANICAL RUBBER GOODS BY
REPUBLIC RUBBER DIVISION

WHO REPRESENTS REPUBLIC IN MY AREA?
REPUBLIC RUBBER DIVISION · LEE RUBBER & TIRE CORP.
YOUNGSTOWN, OHIO

Name, title_____
Firm_____
Address_____
City_____ State_____

YOU CAN BE SURE.. IF IT'S Westinghouse

This walking dragline contains 24 Westinghouse motors, totaling 4,037 horsepower. It can dig 130 feet deep, pick up a load of 32 tons in one bite, dump it 437 feet away and return . . . all in 60 seconds! Secret of the faster operation is Westinghouse Rototrol, a rotating-type regulator which provides smooth, fast acceleration and deceleration.

The M-G sets for large shovels and draglines are now available with spherical seat sleeve bearings. This new development compensates for misalignment and provides adequate lubrication even under severe operating conditions and tilts up to 15°.

Westinghouse

EQUIPMENT FOR THE MINING INDUSTRY

Westinghouse-equipped draglines and shovels

FOR MORE TONS PER MAN-HOUR

Some two-thirds of all large draglines in use in this country are Westinghouse equipped. Many of these are in use by operators who have again and again specified Westinghouse equipment.

For instance, one northern Illinois coal company and an associated company have purchased a total of four large draglines in the past few years. Each time Westinghouse equipment was specified. Another case is a Pennsylvania coal operator who has purchased three such draglines on all of which Westinghouse equipment was specified.

There must be reasons why Westinghouse equipment is so well liked by operators who have tried it. Here are a few of them—

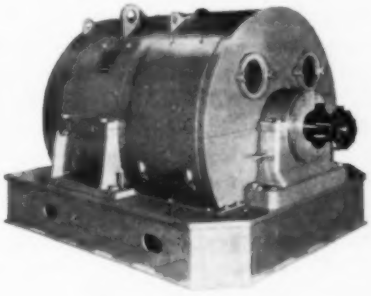
Smooth operation is brought about by Rototrol. This rotating regulator developed by Westinghouse makes possible speed changes with less strain, resulting in less maintenance and smoother operating characteristics throughout.

Fast operation comes from the higher bucket-lowering speeds of the large Westinghouse drive motors. It comes, too, from the fast swing cycle and accurate spotting of bite and drop that Rototrol makes possible.

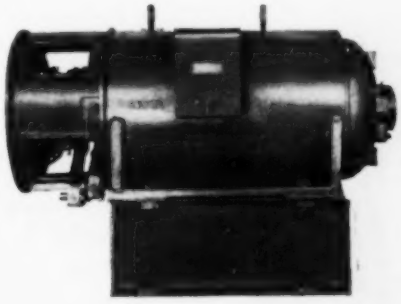
Reliable operation of Westinghouse equipment reduces down time. For example, Rototrol is the simplest of all rotating controls, both as to apparatus and circuits. The large M-G sets are equipped with spherical seat sleeve bearings designed to permit continuous operation even at tilts of up to 15°. Many of the small motors have sealed, pre-lubricated bearings that require no lubrication, and that have a *proved* record of lower maintenance.

This co-ordinated equipment for shovels and draglines is a product of the more than half a century during which Westinghouse engineers have worked with the Mining Industry. If you are interested in handling more tons per man hour, let our Mining Industry Specialists help you work out the answers. Call your nearest Westinghouse Office, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

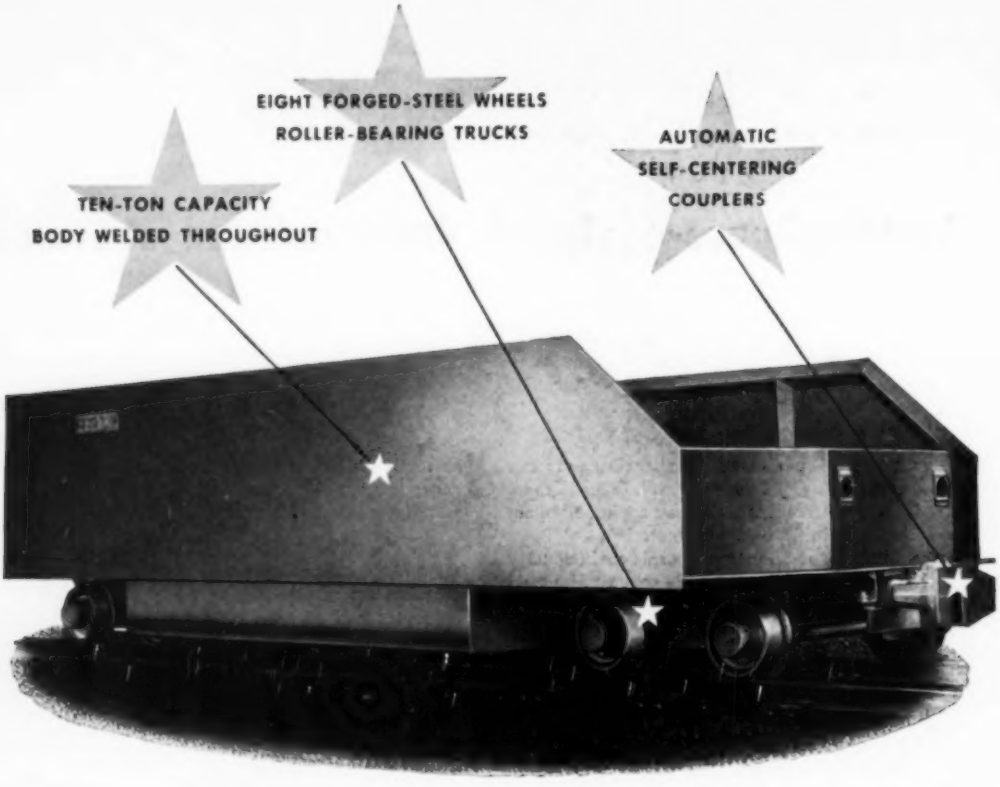
J-94809



In large drive motors such as this, the use of poleface compensated winding makes possible a smaller armature diameter and a lower WR^2. This feature is available both on the 425-hp motor and the 600-hp motor now being offered for use on shovels and draglines.



This is the Rototrol unit that has revolutionized performance of shovels and draglines. By eliminating the sharp changes and attendant strains of Magnetic Control previously used, Rototrol speeds operation and reduces maintenance costs.



Star Performer in Any Mine

Here's a big, burly mine car that's built to lick trouble. It's Bethlehem-made, it's all-steel, and it's engineered for 10-ton loads. A thoroughly modern, streamlined car that can take hard knocks . . . and take them for a long, long time. From coupler to coupler, it represents the very latest in mine-car development.

In many areas the trend is to the larger cars, like the one illustrated. If, however, you prefer a smaller type, Bethlehem will be glad to help you design it. We are fully prepared to furnish either four- or eight-wheel cars, end dump or rotary dump, with high or low sides and welded or riveted construction. When planning additions to your fleet, always feel free to consult with our staff on technical matters.

Bethlehem has built good mine cars for many years and is equipped to do a thorough, conscientious job. Why not let us talk over your needs with you?

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

. . . It's the Completely New and Improved

WHEAT "FORTY-NINER" ELECTRIC CAP LAMP

That gives you all these new features:

- 25% greater light output with no increase in battery size!
- Extremely rugged Butalite plastic battery jars, colored "high-visibility yellow"!
- Simple, positive focussing adjustment—a perfect spot in seconds!
- Stainless steel battery jar tops, smoothly contoured for maximum wear!

Combined with these exclusive, time-proven Wheat features:

Constant, steady, dependable light throughout the entire working shift • "Ironclad" batteries • Actual self-service—fully-automatic charging • Unequalled economy in lamphouse maintenance • No burns from electrolyte.

U. S. BUREAU OF MINES APPROVED

To bring you a new, higher standard of mine lighting!

Write for Bulletin No. 498, and ask your N. M. S. representative for an actual demonstration.

Wheat Electric Cap Lamps are sold, installed and serviced exclusively by

National Mine Service Company

Has the facilities . . . Delivers the goods

BEMECO DIVISION	ALL-STATE DIVISION	WHITEMAN DIVISION	KY.-VA. DIVISION	ANTHRACITE DIVISION	WESTERN KY. DIVISION
Beckley, W. Va.	Logan, W. Va.	Indiana and Altoona, Pa.	Jenkins, Ky.	Forty Fort, Pa.	Madisonville, Ky.

Who Doesn't Want Breakage Like This?

Here Is What Happens When You Use The ROCKMASTER "16" Blasting System!

HERE's the kind of rock-pile blasters dream about! Rock ready for the shovel . . . no boulders too big for the dipper . . . a clean face . . . no toe . . . no backbreak. Blasters get the kind of results they want in quarries, mines, and construction jobs—on the surface and underground—when they use the ROCKMASTER "16" Blasting System to "tailor" the blast to the job. In stripping, they can shoot the burden like this without degrading the coal!

The original Atlas ROCKMASTER development now includes *sixteen* millisecond delay detonators, each timed within thousandths of a second. Your job may call for two, three, even all sixteen. We help you select them to fit the particular job. Drill pattern and explosives are based on what you want to accomplish. This all adds up to greater control over breakage and throw than was ever before possible—plus, in many cases, important savings in drilling and dynamite.

In addition to its many other advantages, ROCKMASTER "16" cuts noise and vibration to a minimum. Bigger shots (generally more economical) can often be made in quarries, strip pits and construction jobs without complaints from neighbors. In underground workings, there is less danger of damaged or loosened roof supports—a real safety consideration.

Write today for booklet on the Atlas ROCKMASTER "16" Blasting System. It includes diagrams for typical loading in quarries, strip pits, mines, and many types of construction.

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

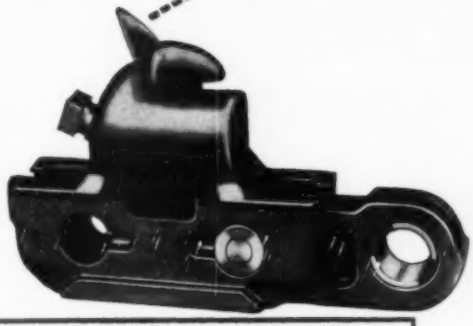
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

PROX

DUOMATIC CHAIN *assures*

DEPENDABLE PERFORMANCE . . . ADDED SAFETY . . . EXTRA LONG SERVICE . . . QUICK AND EASY MAINTENANCE



Here are the reasons for

DUOMATIC CHAIN *EFFICIENCY*

- of strapless design—it is rigid and compact
- no bulky heads that must be pulled through the cutting operation
- interlocks are machined—pins and bushings are hardened for longer cutting life
- no chain whippage as it comes off the drive sprocket
- sumps easier—cuts easier thereby eliminating the cloud of dust normally created in the cutting operation
- parts may be easily replaced in a few minutes on the job

PROX Duomatic Chain can be purchased for using either the DUO Bit or the TOOL STEEL Bit.

PROX TOOL STEEL BITS

A drop forged bit of fine alloy tool steel has been in service since 1938.

Noted for ruggedness and ability to stand abuse over any other manufactured bit.

This bit has been cutting coal for the largest coal companies for the past 10 years.

- **Assures uniform bit gauge**
- **May be changed quickly**
- **Circular back edge is strongest possible design.**
- **Each of these TOOL STEEL points cuts at least as much as a hard tipped ordinary mine bit**

SEND FOR CIRCULAR

PROX

ON THE BANKS OF THE WABASH— SINCE 1875

FRANK PROX COMPANY
INC.
TERRE HAUTE, INDIANA

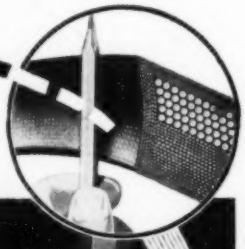
You can actually *feel* the sides of a belt *change shape* as the belt bends.

In Two Minutes You Can See Exactly How . . .

The Concave Side

(U.S. Patent No. 1813698)

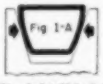
SAVES Your Transmission DOLLARS



Take *any* V-belt in your hands and bend it as it bends in going around a pulley. You will see that the top of the belt, being under *tension*, grows *narrower*. The body, under compression, *widens*. The sides *bulge out*.

This shape change—in a *straight-sided* V-belt—is shown in Figures 1 and 1-A, below.

Straight-Sided V-Belt



How Straight-Sided V-Belt Bulges in Sheave-Groove.

Now look at Figures 2 and 2-A. There you see how the *same shape change* affects the V-belt built with the precisely engineered *Concave Side* (U.S. Patent No. 1813698).

Gates Vulco Rope with Concave Side.

No Side Bulge. Precise Fit in Sheave Groove.

The top of the belt narrows, the body widens. But the sides *merely straighten—and* the new shape *exactly fits* the sheave groove!

Two savings result. (1) Uniform side-wall wear *—longer life!* (2) Full side-wall grip on the pulley carries heavier loads and *sudden load increases* without slipping; saves belts, saves *power!*

The Mark of SPECIALIZED Research

The Concave Side is *MORE IMPORTANT NOW Than Ever Before*

Because the sides of a V-Belt are what actually drive the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley directly through the belt's sidewalls.

Now that Gates SPECIALIZED Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

4910

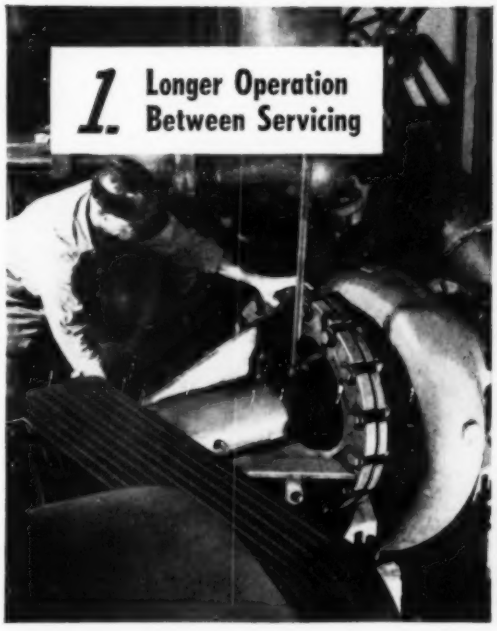
GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS at the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

Save 2 Ways

With Allis-Chalmers Coal Washing Pumps!



THIS IS WHAT TYPICAL COAL OPERATORS say about Allis-Chalmers coal washing pumps:

"In ten months this pump has run without replacement of a single part. Only maintenance has been inspection and lubrication."
"Have just replaced impeller after nine months of two and three shift service."
"Pumping slurry from drier to settling basin, 50% solids. Delivers full capacity after 8 months service."

Here is proof that Allis-Chalmers coal washing pumps *actually deliver* the long service promised for them; proof that they actually do cut pumping costs.

SAVES ON UPKEEP, TOO

Every coal washing pump, regardless of type, requires regular replacement of wearing parts. The Allis-Chalmers coal washing pump makes this job easy, fast and economical.

Dismantling and reassembling takes a half hour or less. Wearing parts are separated and only worn parts need be replaced. Three sets of bearings, brackets and shafts cover all pump sizes, reducing inventory of parts as much as 2/3.

EXPERT APPLICATION ENGINEERING

When you buy, a skilled pump application engineer makes sure you have the *right* pump for your needs. Contact nearest A-C sales Office or write for Bulletin 6381.

A-2763

ONLY FIVE WEARING PARTS

Shaft sleeve, impeller, casing, two wear plates. All easy to handle and easy to replace.

A-C ALLIS CHALMERS

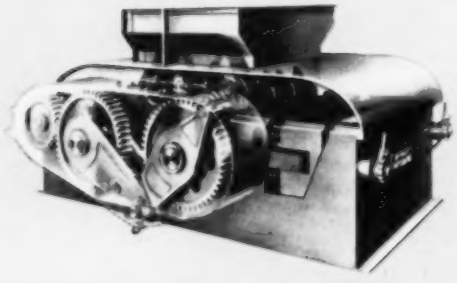
ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Your coal may be up-graded by any of these 3 stages without making a huge investment all at once

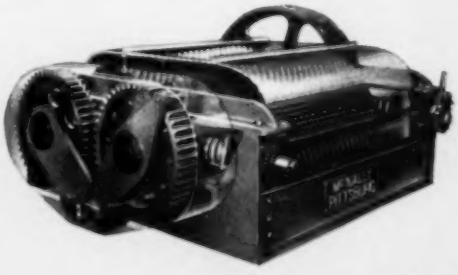
1 CRUSHING and SCREENING

Raw coal with fine natural qualities requires only crushing and screening to maintain its place in the premium price class. Other coal, filled with noncombustible material, can be up-graded to the premium price class by further preparation . . . automatic washing and drying, in addition to crushing and screening operations. • McNally Pittsburg offers a complete line of equipment to up-grade all classes. Equipment is flexible to meet changing market requirements, provides the highest possible tonnage and profit returns to you.



McNally Gearmatic Drive Breaker

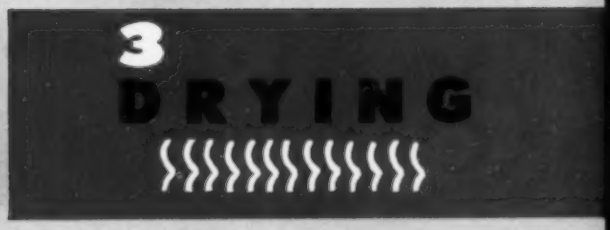
McNally Gearmatic (drives running-in-oil) Drive Breakers handle high tonnages of run-of-mine feed. Available in 3 sizes for capacities up to 1400 tph. Gear train is self-adjusting. Rolls, adjustable over a range of 11". Specially designed crushing teeth exert a splitting action on large lumps which break apart freely without excessive fines.

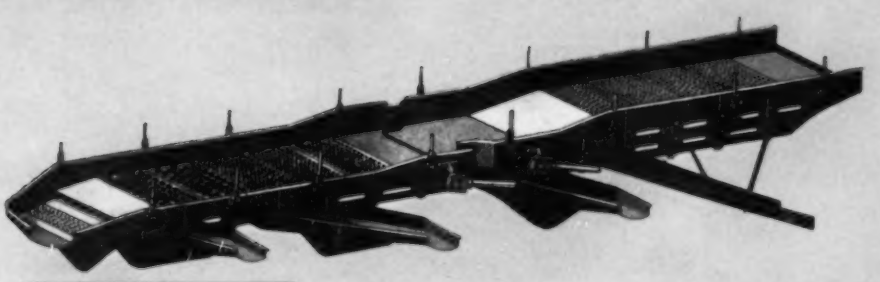


McNally Gearmatic Drive Crusher

McNally Gearmatic (drives running-in-oil) Drive Crushers handle both washed and hand-picked coal. Compactly built for high production, accurate sizing, and a low percentage of fines. The interlocking-tooth segmental crushing roll and the full-floating, fully adjustable Gearmatic drive offer prime advantages. Available in 6 sizes.

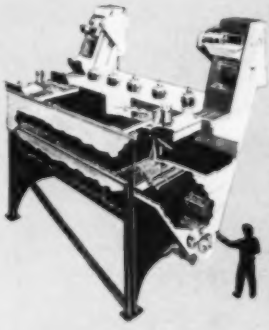
McNally Pittsburg Manufacturing Corporation—*Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio





McNally Screens

McNally Screens are built from blueprints created to suit plant operating conditions and finished sizes of coal desired. The compact construction of the shaker screen illustrated saved 20 feet in length. Washed coal classifying screens feature remote control gates and valves.

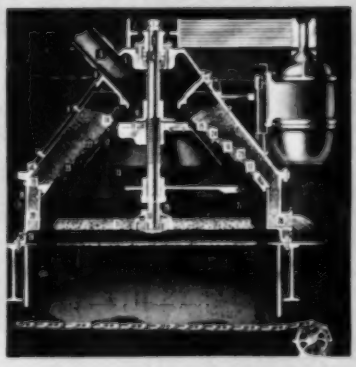


McNally-Norton Washer

Fully automatic washer that assures positive separation of coal from noncombustible material. Specific gravity adjustable to predetermined sizes. Washes sizes to 8". Models from 25 to 450 tph per unit.

McNally-Carpenter Dryer

Centrifugal dryer noted for high water removal, large capacity, small loss of coal in the effluent, low power and maintenance cost per ton of dried material. Dries to any practical desired moisture percentage. Ideal for minus $\frac{3}{8}$" sizes.



Write for Bulletins

Fully illustrated bulletins show the wide range of McNally Pittsburg equipment and service to the coal industry. Ask for . . . "Crusher Bulletin 416" . . . and "Coal Cleaning Bulletin 216." Preparation units may be purchased separately, or included in the complete plant setup.

Ask for advice on how to up-grade your coal

Let our engineering staff, (a) analyze your coal preparation problem, (b) assist in selecting proper units to up-grade your coal to a higher price class, (c) provide for maximum recovery of coal from run-of-mine, (d) advise on the development of salable products from lower grade seams.

Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

Reliability plus Road-Ability . . .

CHEVROLET ADVANCE-DESIGN TRUCKS

CHEVROLET Chevrolet Advance-Design trucks have what it takes to deliver your goods swiftly, safely, surely—under the most adverse driving conditions. They thrive on rough going—perform reliably, efficiently, economically on America's most rugged roads. What's more, wise truck buyers recognize that only Chevrolet trucks give them sensational 3-WAY THRIFT—lower cost operation, lower cost up-keep and lowest list prices. This unsurpassed combination of thrift plus performance makes Chevrolet Advance-Design trucks top favorites across the nation . . . outselling the next two makes combined. For further details see your Chevrolet dealer without delay.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation. Double clutching is eliminated. Faster shifting maintains speed and momentum on grades. Available in series 3800 and heavier duty models.

Chevrolet's power-packed VALVE-IN-HEAD ENGINES provide improved durability and efficiency as well as world-famous economy!

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Uniweld, all-steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axle in the 3600 Series and Heavier Duty Models • Double-Articulated Brake Shoe Linkage • Hydravac Power Brakes in Series 5000 and 6000 Models • Many Color Options.

**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

You get better service wherever you see this sign

There's a *Macwhyte* Rope that's the *right* rope for your equipment. All job-proved — a thousand and one wire ropes to choose from.

Our distributors and mill depots — located at convenient points all over the country — carry stocks for immediate delivery. Ask a Macwhyte representative to recommend the rope best suited for your equipment.

MACWHYTE COMPANY

2931 Fourteenth Avenue • Kenosha, Wisconsin

Manufacturers of Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

Catalog on request

For easy handling and longer service

Use PREformed Whyte Strand Wire Rope—it's internally lubricated

Mill Depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles

Resistor FAILURES COST MONEY!

LOST MACHINE TIME...

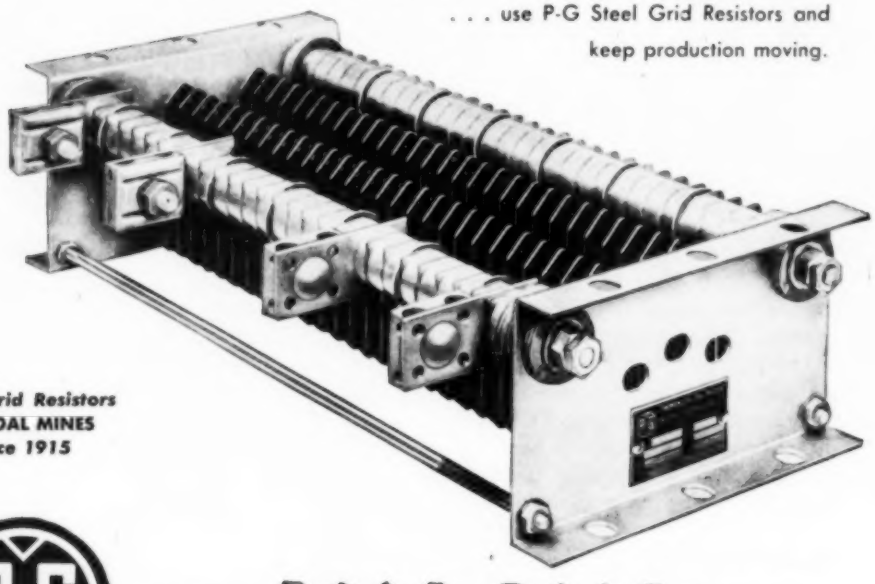
DAMAGE TO MOTORS...

DAMAGE TO CONTROLS...

COST OF NEW RESISTORS...

P-G *Steel Grid Resistors* REDUCE THIS COST...

Steel and mica construction with provision for expansion, enable P-G Resistors to withstand many factors frequently causing resistor failure. By fewer failures, P-G Resistors minimize the effect of lost machine time and expensive electrical maintenance. Be protected . . . use P-G Steel Grid Resistors and keep production moving.



Steel Grid Resistors for COAL MINES Since 1915

P-G

The Nonbreakable Steel Grid Resistor

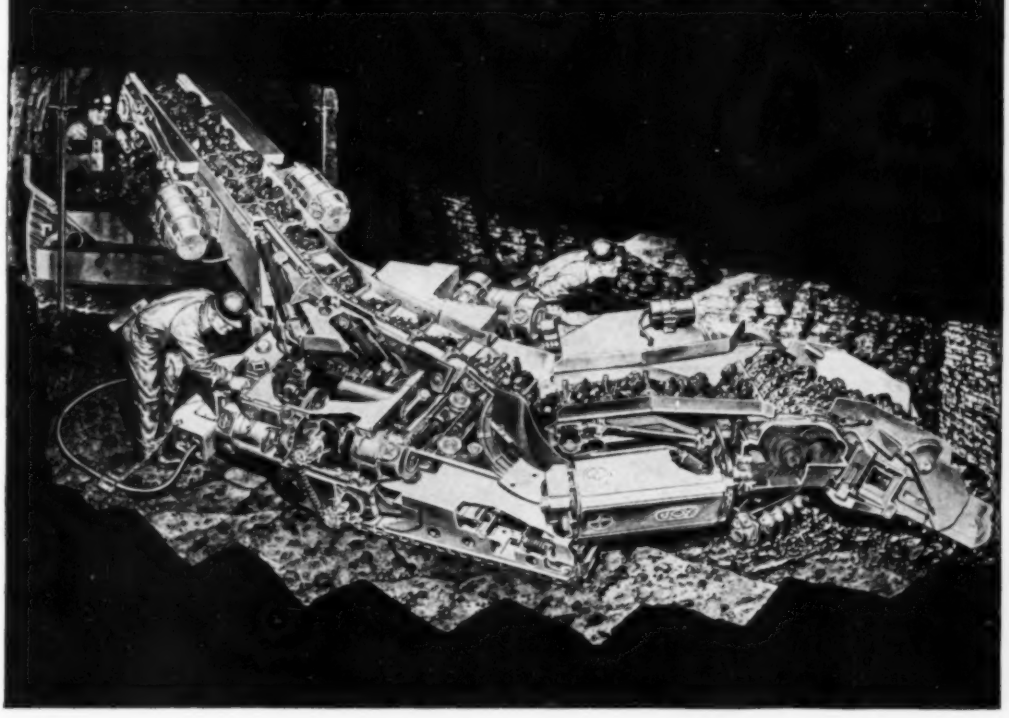
THE POST-GLOVER ELECTRIC COMPANY

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO

MIGHTY MINER DIGS COAL

WITH HELP FROM THE WORLD'S GREATEST LUBRICATION KNOWLEDGE



... You're looking at the inside story of a mining miracle come true. It's a mighty mechanical miner that rips into a seam of coal, passes it back and loads it for haulaway. The machine mines two tons of coal per minute.

An ingenious combination of gears, bearings, pistons and motors, this machine posed a challenging problem to lubrication engineers. Pioneering with the builder (Joy Manufacturing Company), Socony-Vacuum has furnished the right lubricants for every moving part.

Those ripper-head gears are protected by a special shock-resistant Gargoyle Oil. Those hydraulic cylinders are filled with another long-service Gargoyle product and those heavily loaded bearings are guarded by still another Gargoyle oil.

This mechanical marvel gets our complete lubrication program, skilled engineering service backed by 83 years' experience. You, too, can put this program in your plant for more continuous output.

SOCONY-VACUUM GARGOYLE Lubricants

SOCONY-VACUUM OIL CO., INC.
and Affiliates: MAGNOLIA PETROLEUM CO.
GENERAL PETROLEUM CORPORATION

Rely on **SOCONY-VACUUM** *Correct Lubrication*

Rockbestos A.V.C. is permanently insulated with impregnated *felted asbestos*—a material that is older than coal.

The processing of this ageless mineral on electrical conductors to form an enduring insulation was developed by Rockbestos. The original Rockbestos A.V.C. Mining Cable has been *proven* the longer-lasting internal wiring cable for every kind of mechanized equipment. More mines have successfully used Rockbestos A.V.C. — for more years — than any other cable of its type ever made.

When ordering new locomotives, cutters, drilling machines, loaders or other mining equipment, or when replacing old cable, specify "Rockbestos A.V.C."

Rockbestos A.V.C. gives new performance and dependability to old equipment, keeps new equipment newer longer. It's your best cable buy. Send for samples and Bulletin 30-C.

Rockbestos Products Corp., New Haven 4, Conn.

ROCKBESTOS

THE CABLE WITH PERMANENT INSULATION

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.: National Mine Service Co.
BIRMINGHAM, ALA.: Moore-Handley Hdwe. Co.
BLUEFIELD, W. VA.: Superior-Sterling Co.
CHARLESTON, W. VA.: Charleston Elec. Supply Co.
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introducing

the new AIRCO No. 3 MONOGRAPH

gas shape-cutting machine

Another addition to Airco's extensive line of gas-cutting machines will be coming off the production lines very shortly—the No. 3 Monograph, an inexpensive, portable, oxyacetylene shape-cutting machine.

The new No. 3 Monograph, lowest priced machine of its type (only $695, including a manual tracing device, torch, tip, tubular rail, hose and carrying case) will cut steel up to 8" thick in most any shape. Its cutting area is 32 inches by 4 feet 8 inches, and with the addition of 6-foot 8-inch rails, the length of the cutting area can be extended as desired.

Further, in addition to regular shape cutting, this new machine will also handle straight line, circle and bevel cutting jobs—all with a high degree of accuracy.

The Airco No. 3 Monograph is *portable*—the machine itself weighs but 110 lbs. and the tubular rail 35 lbs. The entire unit is packed in a carrying case which can be conveniently handled by two men.

SPECIAL TRIAL OFFER
(Good in Continental U. S. A. Only)

If you would like to try this machine for two weeks in your own shop on your own work, just drop a letter to your nearest Airco office or authorized Airco dealer and they will advise you how this can be arranged. If you would like a descriptive folder (ADC-660) about this unique, new shape-cutting machine, please fill out and mail the attached coupon.

priced at only

See one of the first Airco No. 3 Monographs in operation at Booth No. 2126, National Metal Show, Cleveland, October 17th to 21st, 1949.

AIRCO **AIR REDUCTION**
New York 17, N. Y.

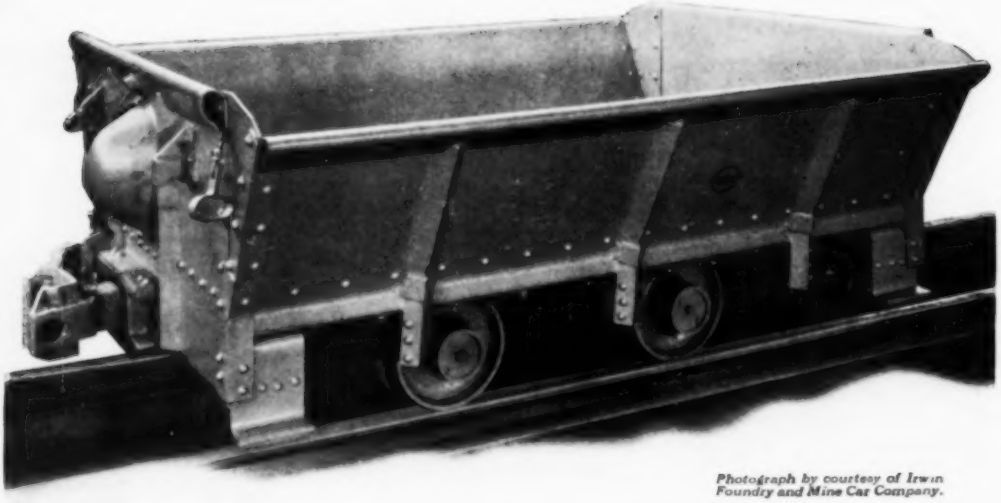
Please mail your folder (ADC-660) describing the Airco No. 3 Monograph.

Name_____

Address_____

Firm_____

City_____ Zone____ State_____



Photograph by courtesy of Irwin Foundry and Mine Car Company.

WILLISON *automatic* COUPLERS

PAY THEIR OWN WAY

ON ANY SIZE OR TYPE OF CAR

Mine and industrial cars are handled faster and safer when equipped with Willison Automatic Couplers. Size of the car doesn't matter. Willison Coupler advantages apply equally to small 4-wheelers or big 8-wheelers.

Their No. 1 advantage is *safety*. During coupling and uncoupling, there is no need to go between cars if Willison Couplers are on the job.

Willison Couplers cut down haulage time because they're always ready to couple when brought together. Their contours being alike, they couple instantly even though cars are reversed.

Simple, sturdy construction gives Willison Automatic Couplers long life. Two essential parts —the head and the lock—do the work. Shocks and strains are minimized—your equipment lasts longer, costs less to maintain.

In safety, speed of handling, easy operation and long life, Willison Automatic Couplers are a "must"!

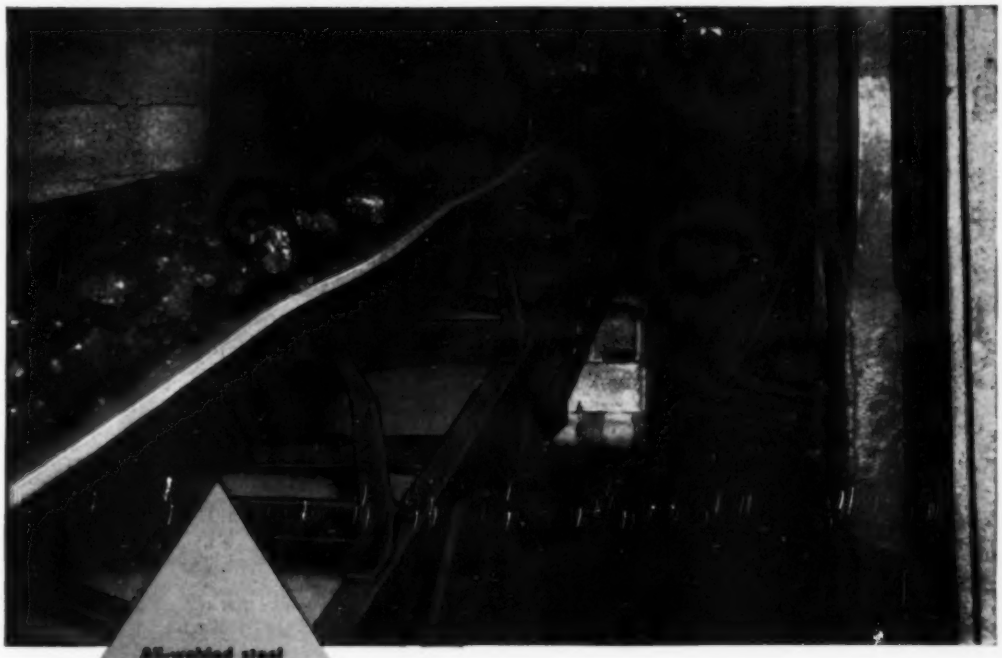
NATIONAL Products FOR TRANSPORTATION AND INDUSTRY Est. 1868

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

CLEVELAND, OHIO

WILLISON AUTOMATIC COUPLERS • NACO STEEL WHEELS • NACO STEEL LINER AND SWIVEL HITCHINGS

Barber-Greene



All-welded steel Belt Carriers

Available in roller, ball or plain bearings
"Four-pass" grease seal protects bearings

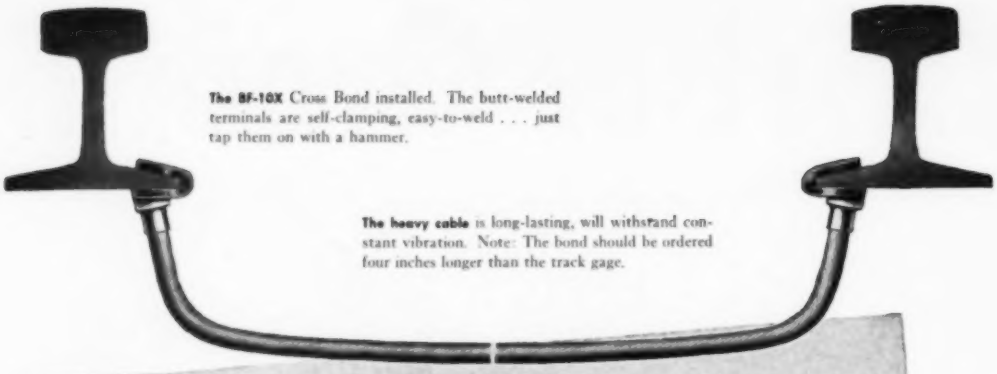
EASY TO CHOOSE . . . EASIER TO USE! BELT CONVEYORS!

Barber-Greene "pre-engineering" simplifies your selection of the right, most economical belt conveyor set-up for your jobs. Standardized units—carriers, frames, take-ups, drives—are factory aligned, interchangeable. You can easily choose the units you need to make up a complete conveyor that's especially fitted to your material-moving problem. And, when they're delivered on the job, you'll find them plainly marked for quick installation with a minimum of "blueprint" work or on-the-spot fabrication. To gain these two big advantages—that have saved money for hundreds of Barber-Greene users—see your Barber-Greene distributor.

BARBER-GREENE COMPANY · AURORA, ILLINOIS

Constant Flow Equipment

LOADERS · PERMANENT CONVEYORS · PORTABLE CONVEYORS · COAL MACHINES · BITUMINOUS PLANTS · FINISHERS · DITCHERS



The BF-10X Cross Bond installed. The butt-welded terminals are self-clamping, easy-to-weld . . . just tap them on with a hammer.

The heavy cable is long-lasting, will withstand constant vibration. Note: The bond should be ordered four inches longer than the track gage.

Here's the latest addition to the TIGERWELD family

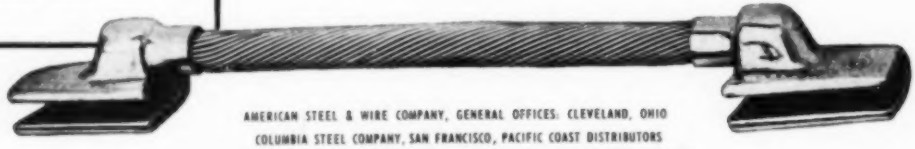
. . . the BF-10X Cross Bond

THE BF-10X Cross Bond is new, but it is already winning praise throughout the country. Here's why:

- It has self-clamping terminals to make installation easy. A few taps with a hammer secure the terminals to the rail, where they remain firmly in place while a steel-to-steel weld is applied. No special clamp needed.
- The terminals are butt-welded, assuring consistent electrical and mechanical results with clock-like regularity. With butt-welding you can be sure that in every case all the wires in the strand are electrically connected permanently to the solid end piece.
- It is a durable bond with great resistance to fatigue stresses. It can be reclaimed and used again and again.

Contact our sales office nearest you for complete information on this and other types of U·S·S American TIGERWELD Rail Bonds. Ask for our free Rail Bond Book.

The BF-10 Bond, companion to the BF-10X, is designed for installation at rail joints. It has the same desirable qualities as the BF-10X . . . it is easy to install, long-lasting, efficient.



AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
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USS

American Tigerweld Rail Bonds

UNITED STATES STEEL

EATON
2-Speed Truck
AXLES

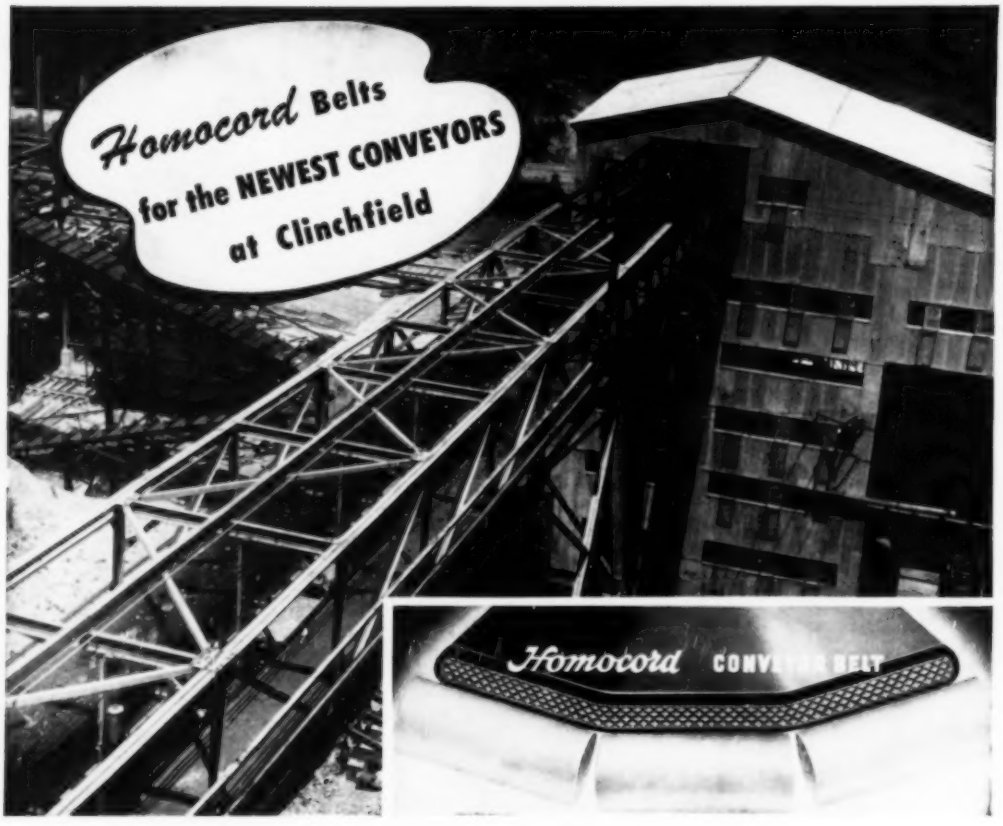
Last Longer because Moving Parts are Always Thoroughly Lubricated

More Than a Million Eaton 2-Speed Axles in Trucks Today

Eaton's exclusive forced-flow lubrication system starts oil on its way to all moving parts the instant the axle turns over. This protection to gears at low truck speeds, as well as high, reduces friction and wear on moving parts, adds thousands of miles of trouble-free life to Eaton 2-Speed Axles. Your truck dealer will be glad to explain how Eaton Axles contribute to lower operating and upkeep costs by embodying a balanced combination of pulling power and speed on most trucks of the 1½-ton class and larger.

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

EATON **PRODUCTS:** SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



...Cushioned...Tough...Flexible...Mildew-Proof

These are the features that won for Manhattan's Homocord Conveyor Belts a place of honor in the modernization program of the great Clinchfield Coal Corporation. For the past four years Clinchfield has been improving its existing plants and developing new properties. Production capacity has been boosted from 6,500 tons a day to 20,000 tons a day.

Of considerable importance to this increased output is the system of conveyors, underground and above ground. Thousands of feet of Homocord Conveyor Belt help carry coal from seam to preparation plant throughout Clinchfield's extensive operations. One installation is photographed above . . . a 48" Homocord Conveyor Belt on a new installation at the Meade Mine. This was taken before the galleries were enclosed.

RIPPLING MUSCLES CONSTRUCTION

Homocord is the preference of progressive mining men everywhere. Its "Rippling Muscles" construction cushions shock loads and flexes easily and naturally in the troughing idlers. These two factors alone insure longer life for the belt—higher production for the operator. Homocord Strength Members were developed by Manhattan engineers solely for conveyor belt use and cannot be equalled in any other belt.

Be sure you specify "Homocord" in *your* modernization program and . . .

Keep Ahead with Manhattan

COMPLETE LINE FOR MINES

Also used in Clinchfield are Buronik Trolley Wire Guard, Condor Homo-Flex Suction Hose, Condor Homo-Flex Air Hose, Water Hose and other Manhattan products

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RM

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

AMERICAN
CYANAMID COMPANY
EXPLOSIVES

"MEASURING" THE STRENGTH OF EXPLOSIVES

To keep ahead of your blasting needs

A special research laboratory at CYANAMID's dynamite plant is helping to turn out better industrial explosives—not only to keep abreast with modern trends, but in fact, to keep *ahead* of them. And this research helps *you* keep ahead, too.

Much of the laboratory's efforts are directed toward the development and testing of new powders to meet the specific demands of modern blasting as shown in the picture above, — wherein a ballistic mortar measures the strength of an explosive by hurling a projectile into the sand pit in the background.

It is this kind of intensive research and quality-control—combined with the most modern manufacturing techniques — that assures you of AMERICAN Explosives which will exactly fill your specific needs.

Capable Field Engineers Are Available At Your Call

★ HIGH EXPLOSIVES ★ PERMISSIBLES ★ BLASTING POWDER ★ BLASTING ACCESSORIES

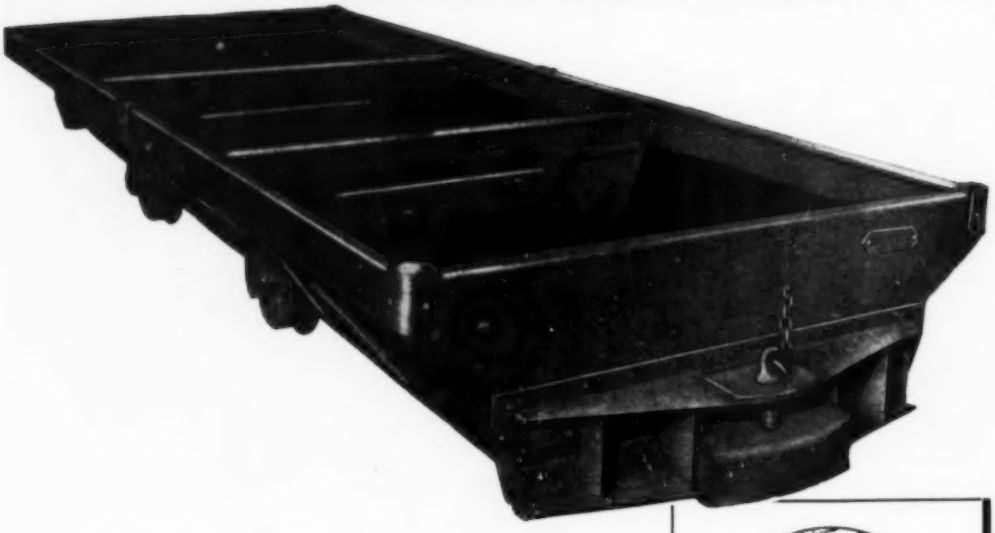
AMERICAN CYANAMID COMPANY

EXPLOSIVES DEPARTMENT

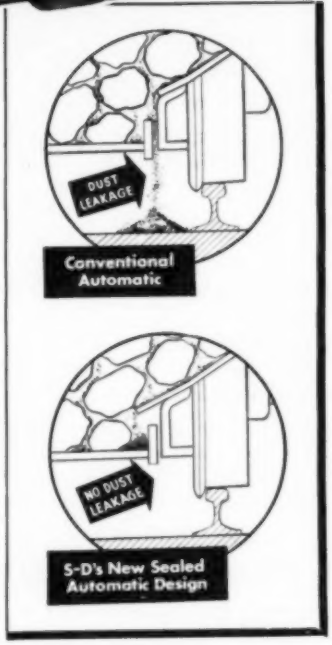
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

SALES OFFICES: PITTSBURGH, PA. • BLUEFIELD, W. VA. • SCRANTON, PA. • CHICAGO, ILL. • POTTSVILLE, PA. • MAYNARD, MASS.

here's why operators are changing over to S-D "SEALED AUTOMATICS"...



More and more operators are changing over to the new S-D "Sealed Automatic" Drop Bottom mine car because . . . In the first place, coal dust leakage has been eliminated between doors and frame by the new Dust-Roof Seal being built into S-D "Automatics." This, plus a new sealed hood over wheels, seals coal dust in the car so it cannot dribble out and down onto the tracks . . . not only making for safer, dustless haulage, but also saving thousands of dollars by eliminating the greatest portion of track clean-up work. In the second place, the very fact that S-D sealed bottom dumping cars are entirely automatic insures the greatest time and labor savings possible in getting coal from the loader to tipple. No uncoupling of cars — automatic dumping on the move . . . fewer cars do more work! This, in addition to the improved long-life construction of "Automatic" cars and foolproof "Jerkout" unlatching device that operates underneath S-D "Automatics," has made more and more operators take a realistic approach to the fact that for more actual dollar returns on the investment, S-D "Sealed Automatics" are, by far, the best buy!



20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. Knoxville 9, Tenn.

Collyer

TIGER-STRIPE

THE SAFETY MINING CABLE

EXTRA-VISIBILITY FOR SAFETY

Tests prove black and yellow is the outstanding color combination for visibility. That's why this combination is widely used by safety experts throughout the world to denote CAUTION — in road construction, in traffic signs, in industry . . . Now, Collyer *Tiger-Stripe* Trailing Cable brings these safety colors into the mine. *Tiger-Stripe* gives quick warning to prevent damage from hand tools, rolling equipment, or other hazards. Mining machines equipped with this easily visible cable are better protected against loss of power.

EXTRA WEAR-RESISTANCE FOR SAFETY

Years of research have proved that *black* neoprene compounds have the best resistance to abrasion, cutting, and tear; and that light colored compounds are only about half as wear resistant.

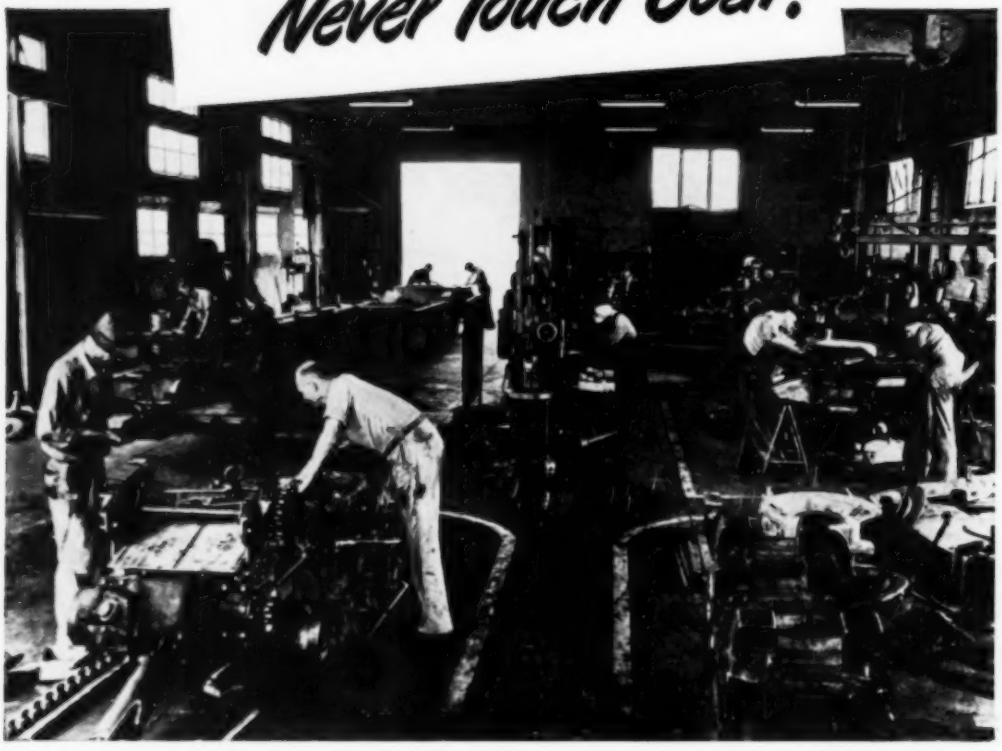
Collyer *Tiger-Stripe* Trailing Cable has the full standard sheath thickness of black neoprene. The Tiger Stripes are applied over this tough neoprene Sheath and bonded firmly to it by vulcanization in a tight, seamless lead mold. The time-proven ability of black neoprene to withstand oils, alkalis, sulphur-water, other acids, and flame is in no way reduced by the addition of the Tiger Stripes. Collyer *Tiger-Stripe* Trailing Cable has full wear resistance plus extra visibility.

Write for samples and recommendations

COLLYER INSULATED WIRE CO.

245 ROOSEVELT AVE., PAWTUCKET, R. I.

These Coal Miners Never Touch Coal!



Modern mine machinery is a 20th century marvel, and it's just good business to put its care in the hands of first-class mechanics and machinists. And good machine shops cost money, a lot of it. For instance, the one shown above, with its equipment, cost all of $150,000. It serves but a single mining operation.

Expenditures like this are necessary in modern coal mining, because today miners rarely touch pick and shovel. Instead, their hands operate the controls of machines. The "heavy work" is done by mechanized horsepower. A cutting machine, an automatic loader, and a shuttle car, whose combined cost adds up to a $60,000 coal mining team, must be kept in top shape to justify the heavy investment.

So mechanized mining, with its need for keeping machines in good running order, has created a new kind of "miner"—the machinist, the electrician, the welder, who keep mine horsepower on the go.

Modern mining practices are a far cry from those of "pick and shovel" days. Today mines are "blueprinted" in advance. Backed by facts learned from geological surveys, engineers can plan mine layout, without running into costly alterations due to unexpected faults in rock and seam formations.

Such planning permits speedy handling of coal from seam to surface for washing, sizing and grading in preparation plants. The result is mass production of many grades of coal, each especially adapted to efficient use in one or another of the many different types of furnaces in America's homes and industries.

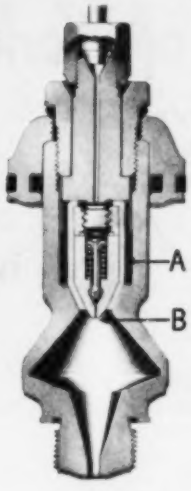
BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION

WASHINGTON, D. C.

BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA



HI-EFFICIENCY FUEL INJECTION VALVE

Typical of the quality built into "Caterpillar" Diesel Tractors are the fuel injection valves. Capsule (A) is easily removable for replacement in the field. No adjustments are necessary. Large single-orifice opening (B) prevents clogging and maintains desirable fuel spray characteristics at all times. Countless "Caterpillar" Engines have operated thousands of hours without the need for capsule replacements.

In there pitching

60 minutes an hour

This big yellow machine has the guts to bear down all day, every day, all the way. It's a "Caterpillar" Diesel D8 Tractor with a "Caterpillar" No. 8A Bulldozer—one of a crew of five used by the Weirton Construction Co., Weirton, West Virginia, for building roads to a coal stripping area. Even when the going is rough, big loads are duck soup for this perfectly matched unit. The 'dozer's rugged blade is scientifically curved to roll the loads, and the D8's hard-hitting horsepower packs the punch to keep 'em rolling.

There's no guessing about the D8's dependability. This husky has been job-proved on thousands of operations across the country. That's why it's No. 1 choice with men who have their sights set on 60-minute hours. You can count on it for high production at low cost—and on your well-equipped "Caterpillar" dealer for top-notch, on-the-spot service.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U. S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

unscrambled, they all say one thing...

Low Cost Per Unit of Work

and that means...

Bethlehem Wire Rope

Ever stop to figure the *real* cost of your wire rope—the cost per unit of work? Do you know, for example, what your rope is costing you for every yard of rock it moves? Or every ton of ore, coal, or slate it hoists? Or every ton-mile in oil-country rotary drilling?

This yardstick—cost per unit of work—is the only *true* measure of wire-rope expense. Purchase price alone is not the answer. The rope with the lowest price tag isn't necessarily a bargain. It's the service life—the total amount of work it will do—that determines your actual cost. That's why we say: specify Bethlehem.

Bethlehem wire rope is a quality product, one carefully and conscientiously built. From the making of the steel to the final reeling and shipping, it is a product that merits your confidence. Because of its long life in service, its cost per unit of work is *low;* it is an economical rope in the truest sense.

Order some today. Check its performance—check thoroughly. We believe you'll soon agree that there isn't a better, more economical rope on the market.

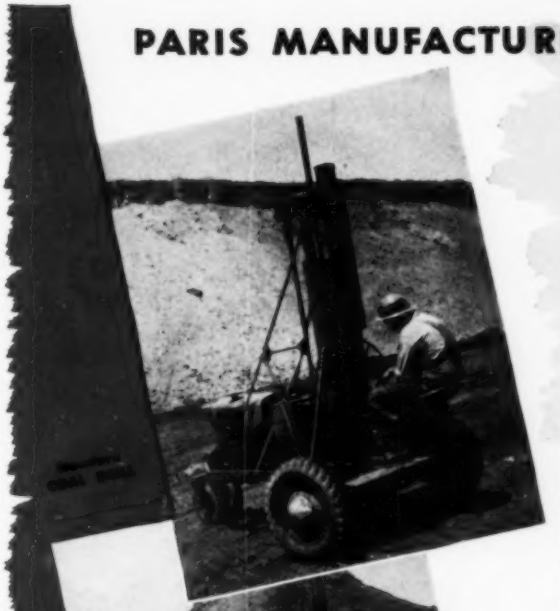
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

PARIS MANUFACTURING COMPANY

Announces

THREE *NEW* DRILLS



The PARMANCO Coal Drill will drill 2½ inch holes at a speed of up to six feet per minute in #5 coal. Equipped with heavy duty truck-type transmission and rear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 12 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

United Electric Coal Companies 6 Enos Coal Mining Co..... 1
Ayrshire Collieries Corp..... 2 Huntsville Sinclair Mining Co. 3
Big Bend Collieries, Inc..... 1

THIS UNIT IS DELIVERING 6-INCH SHOT HOLES — READY FOR LOADING at Better Than a Foot a Minute ! ! !

The new PARMANCO Hi-Speed Horizontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time —a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

PARIS
MANUFACTURING
COMPANY
Paris, Illinois

TRUCKS and SHOVELS keep on the *move*

when you detonate with PRIMACORD

You can figure on better digging when you shoot with Primacord. *Operations speed up all along the line.*

Primacord does this with a combination of forces that team up to give you more complete fragmentation. Down-hole lines initiate the whole charge instantly, from top to bottom, with all the power of primer cartridges. Main lines can be laid out so that front holes go a split second before succeeding ones, allowing for planned relief of burden.

You can get Primacord, wound on easy-to-handle spools, in a grade to meet every blasting condition. It's insensitive to stray currents, and hooks up as fast as you can tie square knots or half hitches. Ask your supplier about Primacord, or write direct to The Ensign-Bickford Company, Simsbury, Connecticut. P-23

PRIMACORD-BICKFORD Detonating • Fuse •

Also Ensign-Bickford Safety Fuse Since 1836

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

OCTOBER, 1949

IVAN A. GIVEN, EDITOR

Not Achieved

BACK IN SEPTEMBER, 1931, following several months of study and talks with numerous coal men all over the country on the problems involved, *Coal Age* suggested "A Stabilization Program for the Bituminous Coal Industry." A major recommendation was increased effort to achieve a better basis of relations between miner and operator. Specifically, *Coal Age* had this to say:

"Inherited prejudices in some fields and bitter personal experiences in others have made the idea of a revival of unionism obnoxious to many employers. Nevertheless, unless some new formula can be found, the conclusion seems inevitable that the desired stabilization of wages and working conditions must come through a recognition and acceptance of an outside labor organization by a sufficiently large percentage of the operators to give the wages and working conditions so established a controlling influence in the districts where direct recognition is withheld.

"Whether this labor organization shall be the United Mine Workers of America or some other new group equally independent of employer control rests largely with the existing union. It is faced with the task of convincing doubting operators that it has abandoned the policies and practices which have made it highly objectionable to many producers, and that it now has the vision and judgment which will promise effective and constructive leadership.

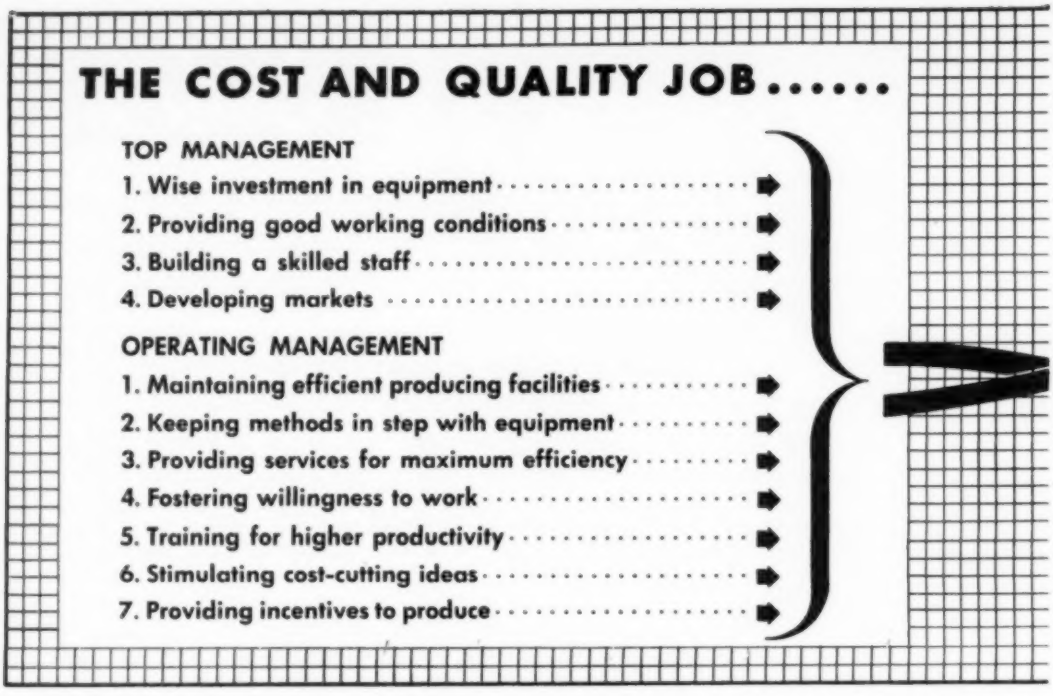
"There must be a genuine partnership between capital and labor if the goal of stabilized industrial relations is to be reached." It might have been added that such partnership is essential not only for stabilization of industrial relations but also for real progress in all other directions.

Since then, at the behest of the New Deal, the federal government has moved into the field of labor relations with the ostensible goal of achieving the desired stabilization. But, has it been achieved? The answer, as far as the coal-mining industry is concerned, is an emphatic "No." As of 1949, the industry is farther from stabilization of relations between employer and employee than at any time in history—and is suffering accordingly.

Fundamentally, the only valid reason for employee organization and orderly collective bargaining is fostering cooperative action designed to advance the interests of the industry as a whole and thereby the individual interests of the employer, the employee and the actual and potential consumers of the product. The aim should be development of firm working agreements and a sincere attempt to serve consumer and public interest by reducing cost, improving quality and rendering a better service.

The record in coal is anything but that—and seemingly is getting worse rather than better. Recent contracts have not been contracts at all in the usual sense of the word, but rather memorandums of working terms handed down by union leadership. Costs have been forced up, production interruptions have been growing in frequency and intensity and, lately, something new has been added: restrictions on output when work has been permitted by union leadership.

The results has been a heavier and heavier burden on coal's ability to compete and to progress through efficiency and service. Stabilization and cooperation have not been achieved, for which the New Deal, which set union leaders up in business and exempted them from all normal restraints, must accept the lion's share of the responsibility. The record is clear that the present system is not achieving the desired goals. Getting it changed may be impossible and certainly is no small task. But if order and prosperity are to be achieved, everything indicates that a change must be made.


THE COST AND QUALITY JOB.....
TOP MANAGEMENT
1. Wise investment in equipment
2. Providing good working conditions
3. Building a skilled staff
4. Developing markets
OPERATING MANAGEMENT
1. Maintaining efficient producing facilities
2. Keeping methods in step with equipment
3. Providing services for maximum efficiency
4. Fostering willingness to work
5. Training for higher productivity
6. Stimulating cost-cutting ideas
7. Providing incentives to produce

Cutting Coal-Mining Cost

Low Cost and High Quality Build Up Coal's Competitive Power—Getting Cost and Quality the Responsibility of Both Top and Operating Managements — Where the Opportunities Are and How They Can Be Realized

CUTTING COST in coal mining is, in the last analysis, a joint job of top management and operating officials down to and including the bosses at the face. Both top and operating managements have specific and individual responsibilities in addition to joint ones. If top management, including the board of directors, fails to provide the proper tools and facilities, the operating department is handicapped from the start in achieving maximum cost reduction. Contrariwise, the maximum in modern equipment will not yield the maximum in returns if improperly used.

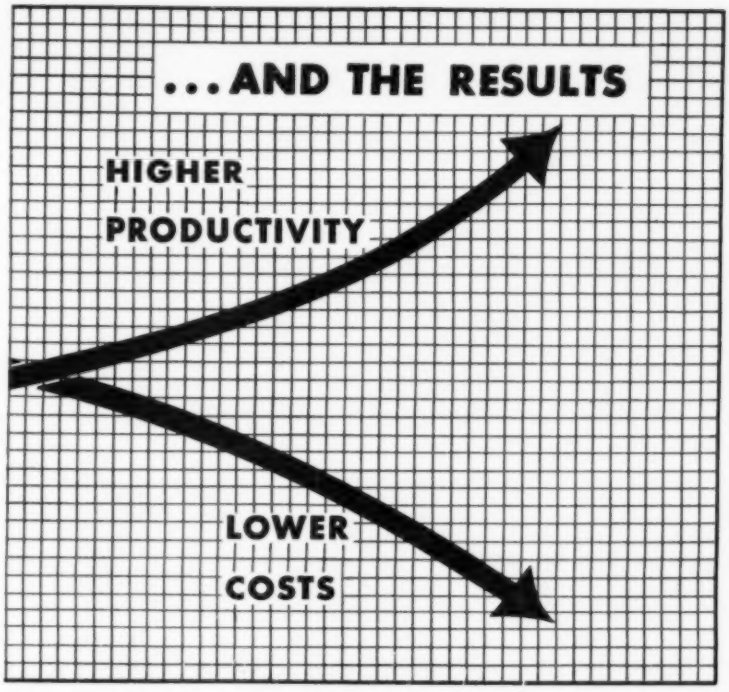
Low cost is, of course, vital in how coal fares in the market place. Equally important is product quality, since it means a lower cost at the consuming end. When the two are properly combined at the producing end, the ideal condition prevails competition-wise. For the industry as a whole, low cost and high quality represent the maximum value to the fuel user, meaning in turn that the industry can exert the maximum force against other fuels. For the individual mine, the men who operate it and the investors who made it possible, low cost and high quality mean more production through better running time, a better living for supervisors, more work and higher earnings for employees, and a reasonable profit for stockholders.

The rewards of cost-cutting and quality improvement, therefore, are real indeed. Realizing them requires little or no pioneering or exploration of unknown territory by either top or operating management. Basically, the roads to be followed in achieving cost and quality goals are as follows:

Top Management

Industry in the United States operates on the concept that a high standard of living depends first of all upon a high productivity per unit of human effort. This involves use of power equipment to an increasing extent and results in an abundance of goods and services, and in the lower costs and prices that put them within the reach of more potential consumers. There can be no abundance without high productivity.

Closely related to this is the fact



that high productivity also depends upon skillful and industrious workers directed by aggressive technical and business managements. This last requirement is highly important because management has much to do with these important factors in industry and individual-company progress:

1. Training and temper of the workers.
2. The calibre of the technical and operating staffs.
3. The supplying of adequate and efficient power and machinery.
4. The development of market knowledge and the adaptation of the product to fit those markets.
5. The creative drive put behind the selling of the product.

Putting it another way, the job of top management in any enterprise is to set the goal and provide the tools, facilities and management know-how necessary to achieve it. Reasoning from this conclusion, some of the major ways top management can function in attaining low cost and a quality product are:

Equipping for Efficiency—In the last analysis, a major job of top management is spending money. This does not mean spending for spending's sake, but wise investment in equipment and facilities that will increase productivity and, as a result, reduce cost.

How far should spending go? No specific figure can be set down for all conditions. However, a guide is provided by careful analysis of the annual cost of adding a man to the payroll. This cost includes not only his wages but also payments for his benefit or as a result of his employment to federal, state and local governments, insurance funds, and the like; the cost of housing, transportation and community facilities, if such must be provided; the cost of getting him to and from his working place, including wash-and-change facilities, man-trip equipment, and so on; the cost of providing the working place itself; and others, including the accounting that necessarily has to be done in carrying him on the payroll.

Taking into account the direct as well as the indirect costs, the management in building at least one new mine in recent years arrived at the conclusion that the annual cost of adding a man to the payroll was approximately $7,000. As a result, it was felt that an investment of as much as $35,000 was warranted to keep from taking on a man.

What are the things it is wise to invest in to keep down cost? The general answer is: Anything that will eliminate hand work. Specifically, the outstanding cost-cutting items are mechanical-mining units. Such equipment has been a big factor in keeping cost down in the past and now the new mining-and-loading machines offer further substantial reductions. In addition, more and more auxiliaries down to and including man carriers and power wheelbarrows are being developed to reduce the labor cost of coal by making manpower more effective.

In investing in equipment, capacity is a major factor. If, in stripping, 10-ton trucks are bought where 20-tonners could be used, the first effect is doubling the expenditure for drivers. The same is true in practically all other surface and underground operations. Since the higher-capacity units normally cost proportionately less than those of lower capacity, a further saving in investment cost also is a distinct possibility.

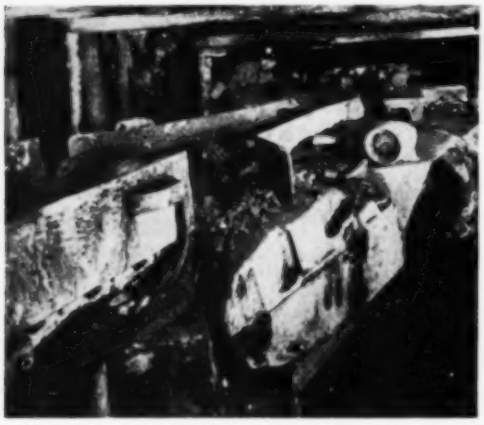
Equipping for Quality—Volume is a major factor in cost and quality of product is a major factor, along with cost, in volume. Stated another way, this means that high quality promotes market acceptance, in turn increasing tonnage, and that in turn reducing cost. Good preparation, therefore, is essential to successful and profitable operation and consequently becomes a primary concern of top management.

In providing for good preparation, there also is an opportunity for keeping down cost. Hand picking, for example, is a high-cost operation, in addition to inherent deficiencies in results. Installation of mechanical-cleaning equipment frequently can save considerable picking labor, with consequent beneficial effect on the cost of the operation.

Increasing coal recovery through providing the necessary facilities is another cost-cutting possibility in planning for good preparation. The major opportunities are three in number: (1) recovery and treatment of fines, (2) recovery of coal from pickings or rejects from present cleaning equipment, and (3) salvaging of coal from mine rock, road cleanings, and so on. Experience at a growing number of operations indicates that substantial savings can be obtained.

Improving Working Conditions—A mine force working under con-

How Top Management Can Contribute to Low Cost and Quality



WISE INVESTMENT in production and preparation equipment

PROVIDING good working conditions

BUILDING a skilled operating staff

DEVELOPING MARKETS through research and creative selling

ditions of maximum safety; in neat, well-kept surroundings; and provided with those things conducive to comfort and pride in the operation, such as good facilities for washing and changing, traveling to work, and so on, normally is a more efficient force. In addition, the direct savings along such lines as the cost of injuries and fatalities can be substantial in themselves. By insisting that safe, healthful and comfortable working conditions be provided and making available the necessary money, top management can take a long step toward a low-cost operation.

Staffing for Efficiency—How well supervisors and men do their jobs is, in the last analysis, the answer to cost and quality problems. Top management naturally starts by finding the best men available for supervisory positions and in turn expects these supervisors to find the best workers available. But is that the complete solution? The answer is no.

Top management can, with profit, go farther—much farther, in fact—by proper action along at least two lines: (1) increasing the number of men with the necessary skills and qualifications that can be drawn on by fostering interest in the industry as a career and making it more possible for those with such an interest to get the training that will make them more valuable when they go on the payroll; and (2) providing opportunities for acquiring further useful skills and knowledge after they enter the industry. Thus, a big job for top management is fostering pre-industry training in schools, colleges and special training centers, and then following up by providing for additional training and education on the job for both supervisors and workers.

Building Markets—Volume, as previously pointed out, is a major factor in cost, all other things being equal. The normal growth in the energy market of the country means a natural increase in volume over the long run. Beyond that, however, aside from the cost and quality factors, volume can be attained only by: (1) expanding the possible market; (2) good merchandising and good service.

Looked at in this way, top management can help the operation by: (1) thorough study of the market and the factors that affect it; (2) conducting and supporting research to protect and expand present markets and create new ones, and (3) insisting on the best in merchandising methods, including skilled salesmen, trained service men, consistent hard-hitting advertising and all the other things involved in persuading a customer to accept a product and keeping him happy forever afterward.

This last point is of prime importance. It is a basic concept of American industrial principle that selling is the true motive power of production. Selling in a dynamic economy is an effort to anticipate needs and translate them into demands. Creative selling is an effort to bake a bigger pie to be shared rather than a scramble for a bigger share of the same old pie.

Operating Management

While there is some overlapping, operating management in any industry normally has responsibilities for cost and quality as sharply distinct as those of top management. In general, operating management, including engineers and other staff members, has the job of getting the most out of the facilities provided by top management and the stockholders. A second vital responsibility is keeping track of developments in methods and equipment, advising top management as to their significance, and making recommendations for expenditures to cut cost and heighten quality where studies indicate that these results will be achieved.

Operating management all the way down to and including the boss at the face has as much of a stake in cost-cutting and quality improvement as top management and the investors in the company. Coal that stands high in customer favor as a result of low price and high quality means more tonnage, more running time and a higher net return. These things insure good jobs at top salaries. It is always better to work for a prosperous, progressive organization that makes money through rendering a better service. Therefore, in cutting cost and raising quality, operating managers and bosses are helping themselves to a better living by insuring good business for the organization. Basically, the job breaks down about as follows:

Equipping for Results—Operating management shares with top management the responsibility for keeping production facilities up-to-date and efficient. Top management, it is true, has to find or allocate the money, but it also has to lean on operating management for the facts which justify the investment. Top management also must depend upon operating management for information and recommendations growing out of advances in the mining art and in the development of equipment. To discharge its responsibilities to the fullest, therefore, operating management must keep abreast of such developments and keep top management posted so that it can do its job the way it should be done.

Equipping for low cost and high quality is, however, only the beginning of operating management's responsibilities. It must use the equipment to achieve the utmost in production and quality results. That involves a number of vital steps, including the following:

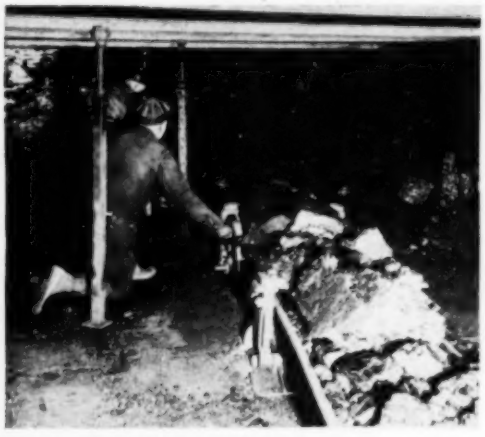
Low-Cost Methods—While the natural conditions—seam, top, bottom, grades, and the like—limit to some degree the choice of mining plan, there still are a few general steps that normally lead to lower cost. In any event, operating and engineering management should not take things for granted in choosing or modifying a system of operation, since a change may have a material bearing on production cost.

Retreat operation, either in full or by working sections, is an example of general mine planning that normally results in a lower cost, especially since modern equipment materially shortens the time required to drive back to the property or other boundary line. And it is an old principle that in retreat operation troubles are left behind and the operation is always moving into undisturbed territory.

Increasing the percentage of extraction is another time-tested method of cutting mining cost. Among other things, it spreads the cost of development and installation of such facilities as track, wire and water lines over a larger tonnage. The saving in most instances substantially exceeds any increase in timbering and other work that may be necessary in pulling pillars.

The tonnage of coal per cut has a direct bearing on equipment moves or interruptions in the cycle, since when a machine is moving or down, production stops but wage payments go on. Wider places and deeper cuts are among the answers.

How Operating Management Can Assure Low Cost and Quality



KEEPING production facilities and methods modern

PROVIDING the production machines with the best in services

MAKING WORKERS more effective by practicing good management

With either present or new machines, the possibility of going on to semi-longwall merits serious study as a means of achieving a major cost reduction.

Service for Efficiency—A fundamental principle still being proved over and over in coal mining is that a loader is no better than the service it receives. By "service" is meant such things as power, haulage, face preparation, and so on. When there is no coal to load, no power to operate with, no cars to fill and no places to work in because of falls resulting from failure to timber, to mention but a few examples, production stops but wage costs continue.

Service is the direct responsibility of mine management. It is perhaps the most important factor in loader and per-man results and, in turn, in costs. Loaders will produce if they are permitted to do so. Therefore, real results are attained by providing the best of service. Briefly, good service includes the following:

1. Voltage at the face equal to the nameplate rating of the motors on the machines.
2. Face preparation—cutting, drilling and shooting—that insures coal for loading all the time, in addition to providing coal in the proper condition for loading.
3. Transportation at all times through an adequate car supply, proper car- and trip-changing methods and equipment, good track, adequate locomotive equipment and, where track is used in the working places, provision for changing points at the necessary close intervals. Wasting time in hauling a car out to the heading to change rather than to a switching point halfway up the place means wasting an opportunity to load, with consequent increase in cost.
4. Good maintenance of loading and all auxiliary equipment to reduce breakdowns and increase actual productive time.
5. Adequate supplies at the point they are needed at the time they are needed. In addition to such things as timber, steel, and so on, this includes repair parts frequently needed at the face.
6. Good ventilation and pumping to improve working conditions and eliminate interference with productive functions.

Fostering Work Willingness—Experience has proved that men who like their jobs, their bosses and their companies are men who produce, thus keeping costs at a minimum. Making men happy in their jobs involves action in a number of directions: for example, good housekeeping in the mine and on the surface, contributing to a sense of pride and satisfaction; real stress on safety to make workers feel that everything possible is being done to keep them from getting hurt; and attention to housing and community facilities where these are provided by the company.

Above all, contented and efficient workers reflect skill in attaining a harmonious relationship between management and said workers; in other words, a friendly, cooperative spirit. Management need not be at a loss in going about the job of building this spirit since the principles have long been known and set down over and over in writing. It is only necessary to apply them.

Training for Efficiency—To make manpower more effective and to create a reservoir of men who can step into supervisory positions when needed, training of mine employees is well worth the consideration of all operating managements. Not all men will want training and many, perhaps, cannot benefit beyond more proficiency in their daily work. However, every effort should be made to provide training for likely candidates or make it possible for them to get it outside.

More informal training in the course of the daily work is a major method of achieving better productivity by increasing the skills of employees. It involves, on the part of management, acquiring the ability to train through study and practice. By attaining proficiency in training and putting the principles into effect on the job, supervisors get more tonnage for the same wage outlay, promote safety and stimulate worker interest and cooperation, all leading to a lower cost. Good men are willing to learn and have a greater respect for the supervisor who can show them things about getting their job done more easily, more efficiently and with greater safety.

Stimulating Ideas—It is axiomatic that an idea can originate anywhere. In other words, no level of authority or position in the social scale has a monopoly on good ideas. Therefore, alert management keeps its eyes peeled for ideas from down the line. In fact, it encourages men to think about their jobs, develop initiative and offer suggestions for improvements. It is not necessary to offer formal rewards to get ideas, though some organizations find it a good method. But a boss who shows his confidence in his men, gives them leeway in their approach to their jobs, listens carefully to their suggestions, and is quick to mark out original thinking for a pat on the back stimulates interest and sooner or later gets a worthwhile tip leading to a very acceptable cost reduction.

Providing Incentives—Making a living for himself and his family naturally is the big reason why a man works. But it is not the whole story. Men like to feel that they are accomplishing something and this provides management with a real opportunity for stimulating productivity through proper use of incentives.

What are some of these incentives? They are not all based on money. Every man likes to feel that he can do a little better than his fellows and normally is willing to try to demonstrate. Posting crew and shift records usually is all that is necessary to bring the competitive spirit into play.

Praise for a good job is another powerful incentive since every man likes to have his achievements noted. A pat on the back or other tangible or intangible reward marks past achievement and puts the man in a frame of mind to do even better in the future.

Above all, there is the incentive of higher earnings and a better living through increased running time resulting from a lower cost and a higher quality of product. Wise operating management makes sure that men get and understand this lesson. In addition, it overlooks no opportunity for making the most of all other incentives.

The need for cutting cost and improving quality is no less now than in the past. Along with the challenge to top and operating managements, the solution to the problem entails real benefits in better business and a more prosperous enterprise. The tools and know-how already developed can achieve real results if properly applied—and more are to come.

With an average wage of $15 per day, for example, raising productivity from 6 to 10 tons per man per day means a cut of $1 per ton in labor cost; from 10 to 15 tons, 50c, and so on. It can be seen, therefore, that even moderate increases in efficiency through better management means substantial savings.

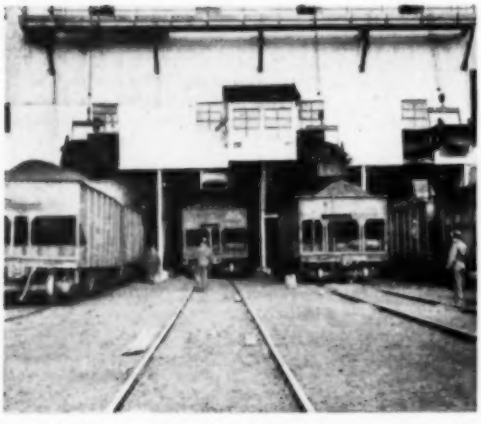
LUCERNE PREPARATION PLANT from the creek side, with loading facilities on one railroad at the right.

How Lucerne Prepares a

Coarse Coal Washed in Two Cones in Series and Fine Coal on 18 Tables—Drying Done in Flash, Screen-Type and Centrifugal Units Plus Filters—Full-Seam Production Converted Into Quality Coal for Steam Markets

By J. H. EDWARDS
Associate Editor, Coal Age

PREPARATION that would accommodate full-seam mining, do the best possible job on all sizes, lose practically no coal and hold final moisture to the low percentages making certain coals especially attractive to Btu- and freight-conscious steam-plant customers was the goal of officials of the Rochester & Pittsburgh Coal Co. in planning a new 500-tph plant placed in service Feb. 1, 1949, at



BELT BOOMS serve three of the four B & O loading tracks. Any size also can be conveyed to a two-track loading tipple on the Pennsylvania on two belts (not shown) to the right. Air-operated chutes permit continued operation while changing cars.

BAG COLLECTORS will trap smoke and dust. Bins (left) handle middlings and coking fines.

Quality Product

Lucerne Mines, Indiana County, Pa.

Although the plant was designed primarily to serve steam-coal markets, some of the output has been shipped for by-product use. While all the problems have not been solved completely, the plant is performing in a manner meeting all of the principal specifications. Mine output is crushed to 6 in, sand-flotation cones operate in series and the plant contains four different types of drying equipment.

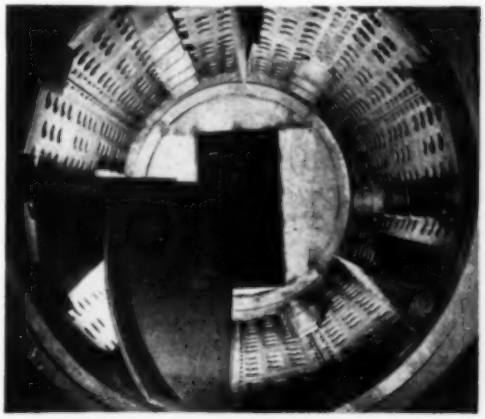
Lucerne mine is a drift operation in the Upper Freeport seam. Total seam thickness is 67 in, including 18 in of top coal, a 9-in laminated-bone parting and 40 in of clean coal below. Full-seam loading is done with crawler-mounted machines. Although the coal is fairly friable and the percentage of fines is high, the run-of-mine size sometimes contains cubes as large as 36 in. Mine cars carry 10 tons.

Heyl & Patterson, Inc., Pittsburgh, Pa., built the plant. Dimensions of the main part are 116x180 ft. The washing section is 85 ft high to the top of the roof, and the air-filtering section is 97 ft high. Except for the rotary dump, the whole layout is new. From the dump hopper, a 36-in by 60-ft apron conveyor feeds the run-of-mine material to a Bradford breaker equipped with 5-in and 6-in round-hole screens. Slate and rock over 5 in taken out by the breaker go directly to refuse. Minus 5-in. material is elevated to shaker screens at the top of the washing plant by a belt conveyor 48 in by 210 ft.

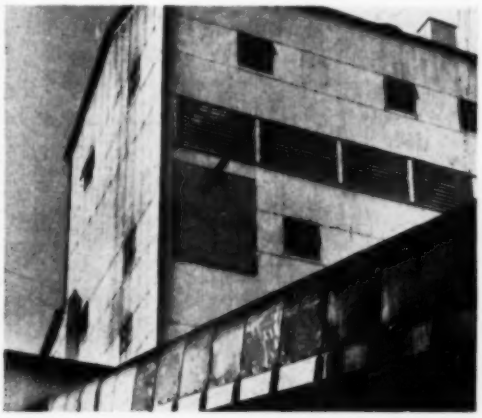
Water totaling about 1,100 gpm is sprayed and flowed onto the main shaker to eliminate dust and help the coal through the screens. The separation is in ¼x0 and 6x¼ fractions. The 6x¼ size goes to a 13½-ft Chance cone operating at a gravity of 1.65. Heavy rock, sulphur balls and slate trapped out of the cone are dewatered, desanded and conveyed to refuse.

The coal product from this first cone, still containing some high-ash coal and low-ash bone, travels over a dewatering and desanding shaker to a second 12-ft Chance cone operated at a gravity of 1.45. The high-ash coal and bone trapped out of this cone are dewatered, desanded, crushed and conveyed to a bin outside the plant. This product, averaging about 25% ash, is transported in mine cars to the company's electric generating plant.

The cleaned 6x¼ coal is dewatered, desanded and sized into 6x2 egg, 2x¾ nut, ¾x¼ pea and

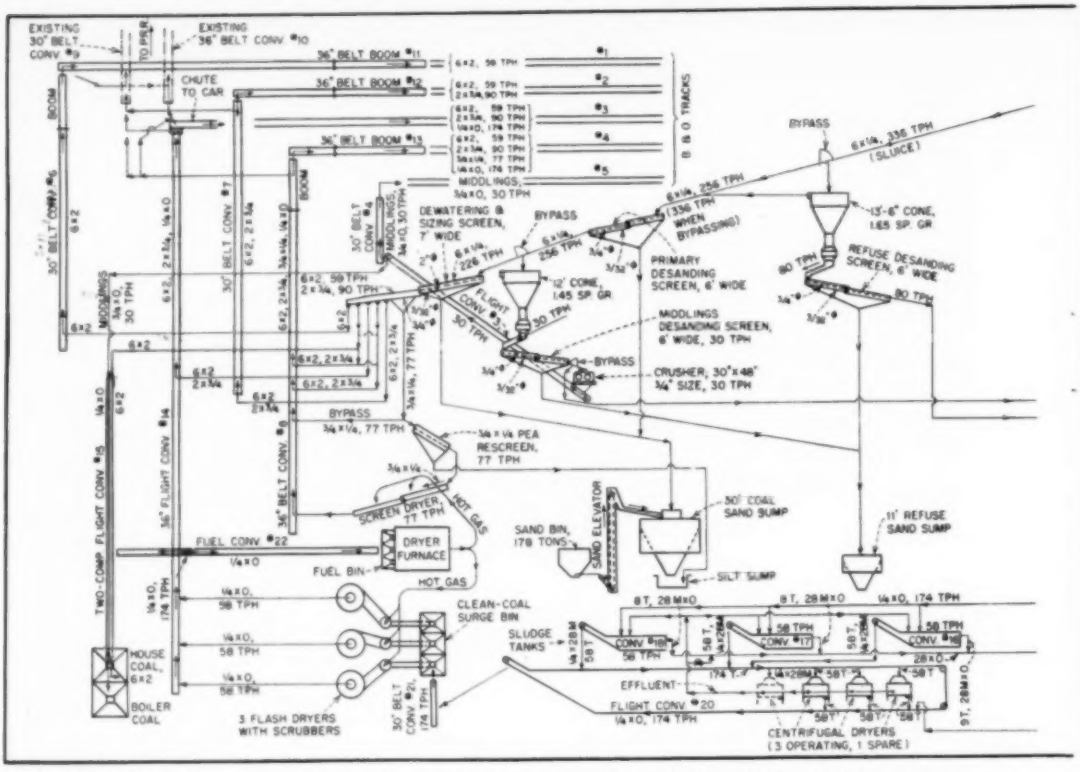


RUN-OF-MINE COAL is reduced in this 9x15-ft breaker with 5- and 6-in holes, which takes out large rocks and timber.

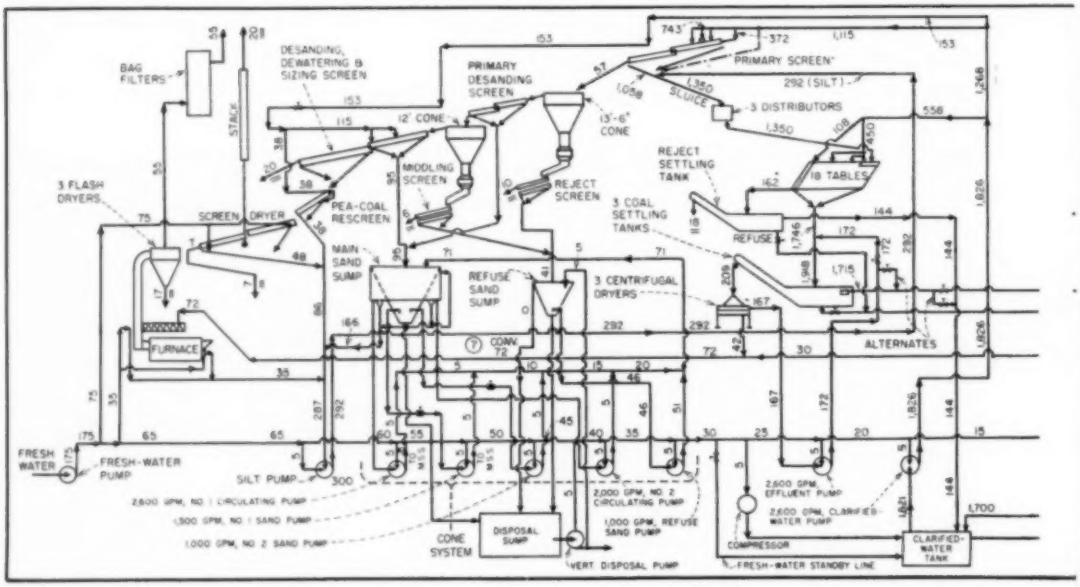


GALLERY HOUSES 48-in raw-coal belt. Highest portion of building houses auxiliary equipment for the flash dryers.

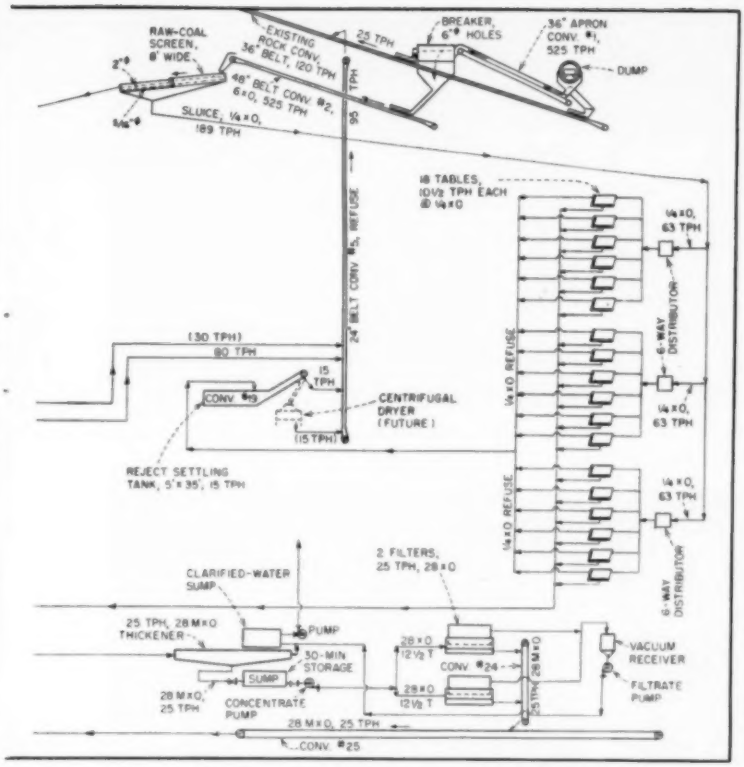
Coal and Water Flow Sheets for Cleaning and Drying at Lucerne



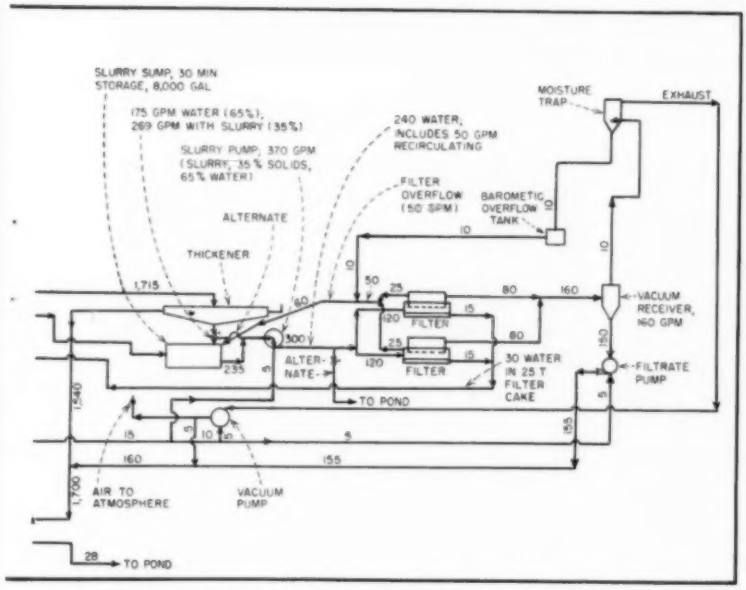
COAL-FLOW DIAGRAM. Lucerne preparation plant, showing cleaning in two cones and on 18 tables, with drying in flash, screen-type,



WATER-FLOW DIAGRAM, Lucerne preparation plant. The numerals alongside the flow lines indicate the water in gallons per minute and



centrifugal and filter equipment. Conveyor numbers refer to Table III.



include the moisture traveling with coal that may be partially dried.

minus ¼ breakage on a third set of shaker screens. The egg and nut are dropped into conveyors to be loaded separately into railroad cars or mixed with any combination of dried pea and dried ¼x0. The ¾x¼ moves across a 4x8-ft Tyler vibrating screen, Type 7520, which removes the last pieces of fines, and then goes to a McNally-Vissac downdraft heat dryer 6 ft 3 in wide. This dryer was installed to permit the achievement of two objectives: shipping coal with a higher Btu content and shipping coal that will not freeze.

Tables Clean Fine Coal

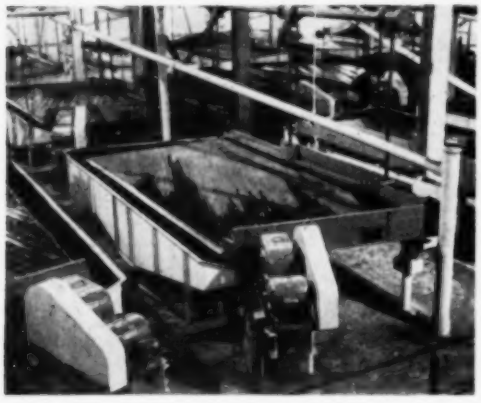
From the wet-type main raw-coal shakers, the ¼x0, carried in a large quantity of water, goes to 18 Deister Concentrator Co. SuperDuty Diagonal-Deck No. 7 coal-washing tables. The cleaned coal carrying water goes to three 4x16-ft vibrating screens (not shown on the flow diagram), where the plus-⅛ is screened out and dewatered to 8% surface moisture. The minus-⅛ coal and water go to three settling tanks and the coal product removed from the tanks goes into three 48-in centrifugal dryers. Four such dryers are installed, one serving as a spare.

The ¼x⅛ screen-dried and minus-⅛ centrifugally dried coals are combined. This mixture, containing 10% moisture, moves to three Raymond flash dryers. The coal is dropped into the steel-cased columns, through which pass high-speed upward currents of hot furnace gases, and in a few seconds of tumbling and floating is dried and reduced sufficiently in weight to ride the upward current to cyclone collectors, where it is trapped out.

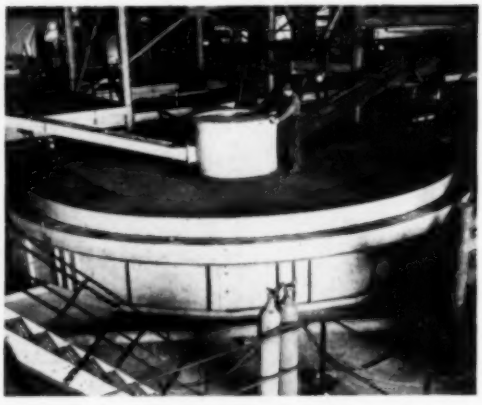
Rated drying capacity is 175 tph and final moisture averages 2%. Bag collectors to trap the small quantity of very fine carbon escaping the cyclones had not been completely installed at the time this description was prepared. The casings and ducts were in, but the bags remained to be installed. Completion was awaiting manufacture of a cloth that will withstand the 200-F temperature to which it is expected the escaping gases can be held.

Sludge-tank overflow water, carrying the very fine coal which did not settle out, goes to a 90-ft Dorr thickener. From here, the soupy mixture of coal and water is pumped to two vacuum filters, each consisting of eight disks 8½ ft in diameter. Cake from these filters joins the coal from the centrifugal

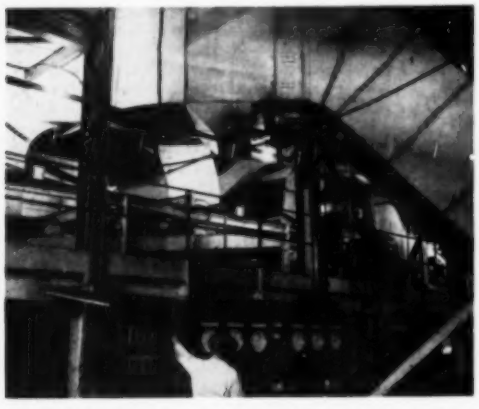
Lucerne Plant Combines Varied Equipment for Effective Preparation



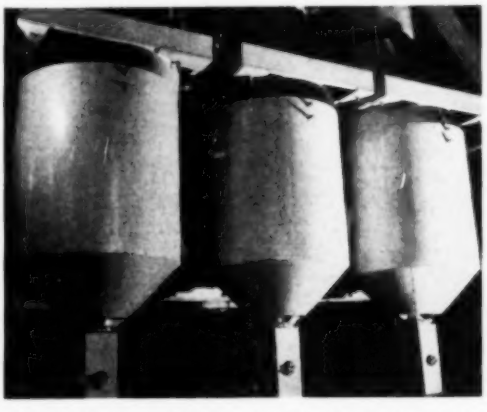
EIGHTEEN TABLES wash the ¼x0 coal. Clamp-and-gasket joints permit rotating table feed pipes to offset wear.



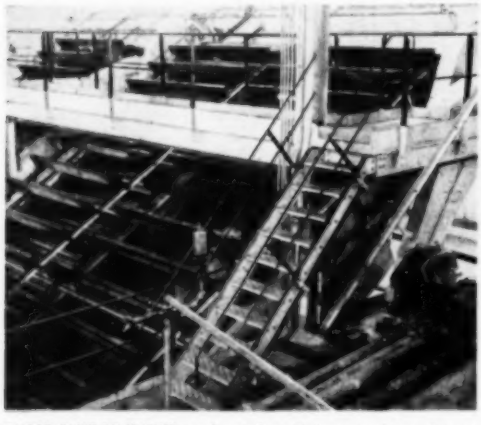
TWO SAND-FLOTATION CONES are served by this main sand sump with a diameter of 30 ft.



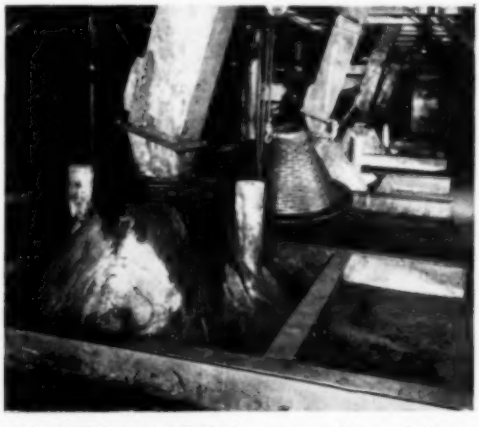
CONTROL PANEL and graphic thermometers for the three flash and one screen-type dryers, with hot-gas duct to latter overhead.



THREE FLASH DRYERS (bottoms shown here) handle the final drying of ¼x0 from the centrifugal dryers and filters.



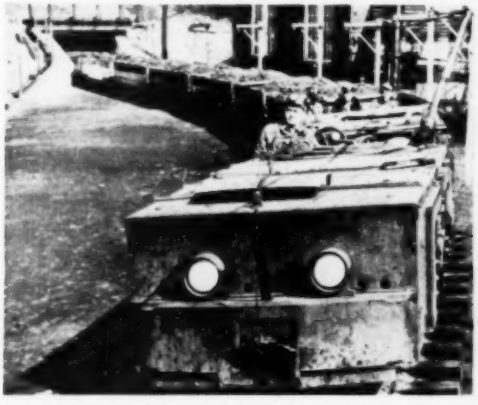
THREE SLUDGE TANKS, each rated at 58 tpm, receive and treat the ¼ by 28-mesh coal from the 18 washing tables.



FOUR CENTRIFUGAL DRYERS (one a spare with extra basket on hand) perform the first step in drying table coal.

TWO VACUUM FILTERS, each with eight disks 8½ ft in diameter, dewater the fines from the 90-ft thickener

LINING CHUTE with ¾-in-thick hard-burned brick. Steel section cut out for access is later welded back in place.



TANDEM LOCOMOTIVE and a trip of 10-ton mine cars on its way to the dump house ½ mi from the portal.

ELMER TRAUTWEIN (left), mechanical engineer; with C. C. Hockenberry, general outside foreman; D. W. McChesney, shift foreman.

dryers in the three flash dryers.

The company operates coke ovens at Ernest, not far from Lucerne. Pending construction of a cleaning plant at Ernest, the dried ¼x0 from Lucerne is being hauled to the ovens in mine cars covered with tarpaulins to prevent wind loss en route. It is necessary to have some of this cleaned slack to lower the ash of the coke.

Table I shows the size consist, the tonnages per hour and percentages of rejects upon which the design of the plant was predicated. Table II, summarizing the actual performance, shows final ash percentages ranging from 7 for the ¼x0 to 11 for 6x2 egg. By holding the slack to 7% and drying it to a moisture less than that of uncleaned coal from many mines, the Btu value is made relatively high. Output of the plant has been brought up to 5,000 tons per day of three shifts, the underground being worked that number of shifts also.

All shaker screens (Heyl & Patterson make) are of the Parrish board-hung type. One furnace 21 ft 7 in wide by 27 ft 5 in long and equipped with five Combustion Engineering Raymond spreader-type stokers, supplies hot gases for the three flash and one screen-type dryers.

Settling tanks are equipped with aluminum flights which, in performance, are comparable to stainless steel. They do not corrode and therefore remain smooth and continue to be self-cleaning. Stainless steel is used on bottom decks of the desanding screens. Wherever possible, the sluiceways and chutes handling solids are lined with hard-burned brick to a thickness of 1¼ in on the bottoms and ¾ in on the sides.

Two spare baskets complete with new screens are kept beside the centrifugal dryers ready for quick installation. Baskets are changed and the screens renewed after about 40 hr of operation.

Crank-shaft and connecting-rod bearings for the shaker screens are fitted with pipe and hose connections, thus bringing the pressure-gun greasing fittings for each unit to a central point beside the screen.

Water circulation in the plant totals approximately 13,000 gpm. Pumps were supplied by Goyne. The side-suction type of pump was selected to reduce maintenance costs since with this type the impellers can be changed with a minimum of labor. The three largest pumps,

TABLE I—Coal Characteristics Used in Lucerne Plant Design*

	Per Cent of Total	Raw Coal, TPH	Per Cent Rejects	Rejects, TPH	Washed Coal, TPH	Power-Plant Fuel, TPH
6x2	23	121	40.5	49	59	13.0
2x¾	23	121	17.3	21	90	10.0
¾x⅛	18	94	10.6	10	77	7.0
⅛x0	36	189	8.0	15	174	...
Total	100	525	18.1**	95	400	30.0

*Rotary-breaker rejects estimates at 0 to 5%; plus 6-in to breaker estimated at 20 to 25%.
**Including power-plant fuel, 23.8%.

TABLE II—Lucerne Performance

	Raw Coal, % Ash	Shipped Coal, % Ash
6x2	26	11
2x¾	26	9½
¾x⅛	18	8½
⅛x0	11½	7

TABLE III—Lucerne Equipment and Motors

	Number Motors	Horsepower, Each Motor
Apron conveyor No. 1	1	30
Rotary breaker, 9x18 ft	1	50
R.O.M. belt No. 2, 48-in	1	75
Raw-coal screening equipment	1	30
Cone-cleaning equipment:		
Agitators	2	7½
Circulating pumps	2	75
Main sand pumps	2	30
Refuse sand pump	1	15
Air compressor	1	50
Primary desanding screens	1	50
Refuse desanding screens	1	15
Middlings desanding screens	1	15
Crusher, power-plant fuel, 30x48	1	75
Middlings flight conveyor No. 3	1	10
Middlings belt conveyor No. 4	1	10
Refuse belt No. 5, 24-in	1	10
Clean-coal dewatering and sizing screens	1	30
Belt conveyor No. 6 to boom, 30-in	1	10
Belt conveyor No. 7 to boom, 30-in	1	10
Belt conveyor No. 8 to boom, 36-in	1	15
Loading booms Nos. 11, 12 and 13	3	15
Flight conveyor No. 14	1	40
Two-compartment flight conveyor No. 15	1	30
Screen-dryer, eccentric drive	1	10
Screen dryer, exhauster	1	100
Table distributors	3	¾
Tables	18	3
Sludge-tank conveyors Nos. 16 and 17	2	10
Sludge-tank conveyors No. 18	1	10
Conveyor No. 19 (refuse)	1	10
Centrifugal dryers	4	60
Flight conveyor No. 20	1	50
Belt conveyor No. 2 to flash dryer	1	10
Flash dryers (three):		
Air locks	3	2
Wet feeders	3	10
Fans	3	150
Stoker	1	3
Blower	1	20
Fuel conveyor No. 22	1	5
Sand elevators	1	5
Clarified-water pump	1	75
Silt pump	1	10
Effluent pump	1	10
Fresh-water pump	1	30
Disposal pump	1	10
Vacuum pump	1	150
Slurry pump	1	10
Filters	2	5
Filtrate pump	1	10
Filter-cake conveyors Nos. 24 and 25	2	5
No. 2 air compressor	1	15
Sample crusher	1	7½
Rotary dump	1	10
Rock gate	1	5
Rock feeder	1	10
Rock belt	1	50
Rock-bin gate	1	5
Mine-car spotter	1	30

each rated at 2,600 gpm and each driven by a 75-hp motor, are the No. 1 and No. 2 circulating pumps and the clarified-water pump. Sand lines are rubber pipe. Two 8- and three 6-in lines are in use.

The new Lucerne preparation plant loads to two railroads. There are four loading tracks on the B & O, at the plant proper, and two on the Pennsylvania across the creek. The two 36-in belt conveyors taking coal across to the Pennsylvania tipple are 250 ft long and were in service before the new cleaning plant was built. As on the B & O tracks, any size can be loaded at the Pennsylvania tipple. However, only two sizes can be loaded on the Pennsylvania side at one time.

The refuse pile begins at a point not far from the Pennsylvania tipple and the 36-in belt conveyor from the plant to the bin, which loads to an electric larry, is 500 ft long.

Five men per shift are truly cleaning-plant operators. However, including one dumper, one coupler, five railroad-car handlers, two maintenance men for the plant and outside equipment, and one refuse-larry operator, the total crew per shift is 24. One man per shift runs the pumps, greases, adds sand and does miscellaneous jobs. A coal dispatcher stationed in the crow's nest between the loading booms at the main plant is charged with the duty of interpreting orders and instructions and making changes for the tipple operator, who is there also.

Total connected horsepower of the 98 motors in the plant is 2,408. The largest motors are three 150-hp units driving three 72-in Buffalo Forge suction fans pulling hot gases through the flash dryers and the cyclone collectors. All motors are operated on 440 volts, the 25-cycle power being generated in the company's plant and the voltage being stepped down at a transformer substation adjacent to the preparation plant. Practically all of the motors are wound for 750 rpm (synchronous speed) and a few for 1,500. All are started across the line.

The plant structure is steel and concrete and completely without wood. Roof and sides are covered with protected corrugated steel.

The Rochester & Pittsburgh Coal Co. has its offices in a company-owned building in Indiana, the county seat, a central point for the ten mines operated by the company, which have been producing at the rate of 6,000,000 tons per year. J. J. Snure is production manager; F. P. Calhoun is assistant production manager (production control), and T. D. Blue is superintendent at Lucerne. C. C. Hockenberry, general outside foreman at Lucerne, looks after the new plant.

HAULING OVERBURDEN is a growing practice as anthracite pits go deeper. Rugged well-designed equipment is the answer to conditions such as shown here, with modern high-capacity trucks providing haulage versatility.

Anthracite Stripping Today

Anthracite Stripping Marked by Progress and Development—Equipment Improvement and Engineering Planning Lead the Way—Operating Control Insures Efficiency —Legal Controls a Growing Factor as Industry Expands

ALMOST ONE of every four tons of anthracite is strip-produced. Such a portion of total production places modern anthracite stripping operations in the category of heavy industry, and this conclusion is supported by evidence of the great strides made in equipment development and strip-mine engineering.

Anthracite men will recognize the changes characteristic of the industry over the past years, these changes being tied to equipment development and engineering advances. A man and mule with a plow and a scraper opened the early pits and showed the industry the possibility of using crop coal as a means of increasing production and lowering unit cost. Steam shovels for moving overburden and coal, and narrow-gage railways for haulage were the next steps—and natural ones—since these equipment units were available at the time. The ratio of overburden to coal which could be economically exploited was increased when power equipment was introduced. Throughout the history of the industry this stripping ratio has been the governing factor in limiting pit operation on one hand and forcing equipment and engineering advances on the other.

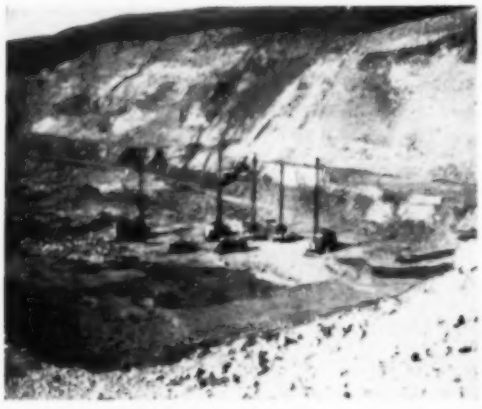
Development of gasoline-powered shovels and trucks, followed by diesel-powered equipment, and a rapid increase in the size and capacity of diesel units have marked skirmishes in the battle with the stripping ratio. A major development was the introduction and use of large draglines, diesel- and steam-powered, which were used to the limit of their effectiveness at many operations. Draglines were applicable at the time because the depth of the pits required that spoil be cast and room was available for storage of the spoil. Draglines operated more economically in medium depths than did the load-and-haul equipment. However, as strippings increased in area and depth spoil areas within the pits have been reduced and large operations have returned to the practice of hauling spoil out of the pits. Present practice favors heavy-duty trucks over other methods of haulage.

With each advance in engineering and equipment design, pits have grown larger and deeper, consistent with coal reserves and available capital. Also, with each advance operations have been abandoned or suspended because economic conditions have decreed such action. It was a matter of old systems and equipment being unable to compete with new.

Modern strip mining on a large scale is a result of engineering experience gathered through preceding years and greater advances in equipment design, not the least of which is electrification of pit equipment. High-voltage transmission, efficient substations, and tough, long-lasting portable cables provide power at the digging equipment within reasonable voltage-drop lim-

Modern Equipment and Sound Planning Promote Operating Efficiency

CASTING IS PRACTICED where spoil storage space is available and draglines can be economically employed. After stripping the overburden, some draglines stockpile the coal for loading on the dragline bench.



OVERBURDEN PREPARATION normally requires large-diameter holes and churn drilling for proper fragmentation and good loading.

SCRAPERS CUT CYCLE TIME by dumping "on the fly." Removing soft overburden lets draglines work efficiently at lower levels.

its. Rotating controls on modern shovels and draglines are designed to force desired performance from the equipment automatically and Ward-Leonard control systems have been modified to produce these results.

Improvements on haulage equipment have never lagged far behind shovel development. Trucks used in the modern anthracite strip mine are closely matched to the loading machines they serve and are built to perform efficiently under the naturally tough conditions in most pits. This matching of hauling and loading units is a result of planning to meet conditions normally to be expected, and of sad experiences with mis-mated equipment in the past. Truck power units are designed for the loads they must move and the grades over which they will operate. Research programs on tires, power-transmission systems and metal-alloying have resulted in haulage equipment providing maximum pay-load capacity per unit of truck weight.

Other types of haulage units have been introduced in the big pits to meet specific conditions. High-capacity tractor-drawn scrapers for removal and disposition of soft overburden and bottom- and side-dump wagons have helped to speed recovery, where they could be used, by cutting cycle time.

Large anthracite operations offer excellent examples of planned layout and strict operating control. Fig. 1 is an example. Present plans call for removing 41,000,000 cu yd of material. Thus it becomes apparent that this operation is a long-range industrial venture and a true "open-pit" mine. Plans for the operation were completed and the work was scheduled before excavation was begun. A seemingly ambitious undertaking at the outset, subsequent developments have demonstrated that the preliminary planning was well done, and changes in plans have not been any more frequent or drastic than those inherent in any mining venture.

Planning, however, does not insure efficient performance, and all the successful operations in the region testify that strict operating control is necessary if plans are to be fulfilled. Production schedules are set and followed; physical characteristics of the pits, as outlined in the plans, are maintained; and the care of equipment is constant, complete and controlled.

Strip mines in the anthracite re-

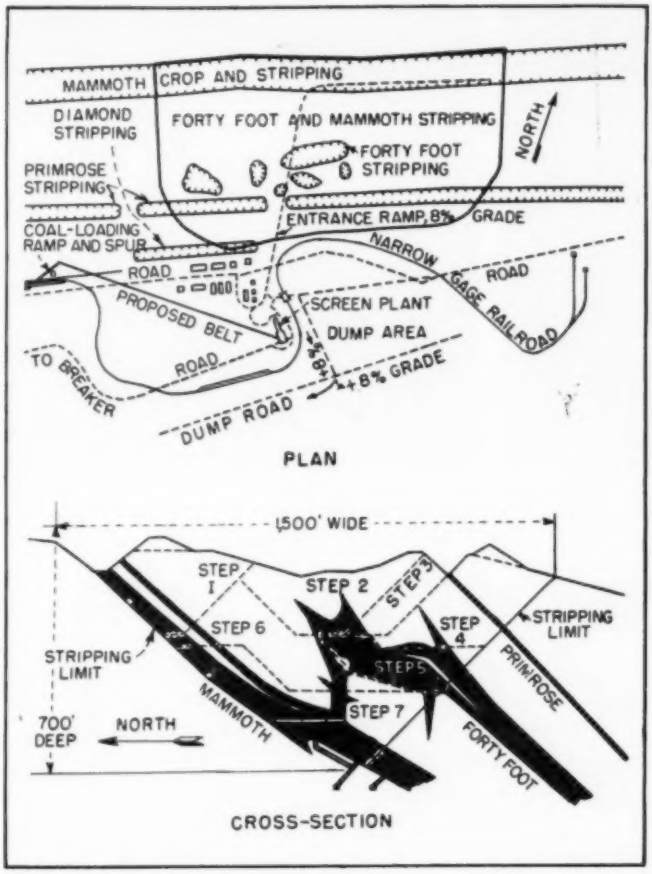


FIG. 1—COMPLETE ADVANCE PLANNING is necessary. Overburden is hauled out of this operation, which includes pits worked in earlier years with smaller equipment and casting.

gion have developed to such a size that an accumulation of small inefficiencies and oversights can endanger the projects. Recognition of this fact has resulted in intelligent initiation and vigorous execution of definite plans. As equipment needs and pit sizes have expanded, equipment maintenance has progressed from meeting emergencies as they arose through truck-mounted service units to the complete shops now an integral part of the large long-term operation. Some of the shops are equipped to handle electrical and mechanical overhaul and repair jobs on the largest pieces of equipment, and preventive maintenance is a byword at all successful strip mines in the region.

Road maintenance in the production and spoil areas receives careful, constant attention because it pays dividends by conserving tires, reducing the effects of vibration on truck bodies and keeping equipment working in spite of weather conditions.

Highwall blasting has also undergone some changes—from single localized shots in early practice to the multiple-shot quarry blasts in the modern pit. Proximity of towns and cities to many large operations requires that blasting engineers exercise complete control of shooting, and this includes procurement and preservation of seismographic records of the earth vibrations produced by blasting. Such precautions —necessary under modern methods —were not considered a few years ago.

Blasting precautions observed by strip-mine operators emphasize the public responsibility facing the industry. Litigation is always a threat and the nature of strip-mine shooting is such that nearby residents are quick to believe that any apparent damage to property is a result. Vibration records prove that earth movements resulting from blasts are far below critical limits. The Pennsylvania Department of Mines, after conferring with representatives of the industry, has set a displacement of 0.030 in as the allowable maximum in buildings adjacent to the operations. Records show that 0.015 in is nearer the actual maximum. Blasting complaints are only one of the many problems which plague strip-mine operators if they are not prepared to meet them and to answer charges with facts. Other legal controls must be recognized since Pennsylvania requires a bond to insure level of spoil banks when operations are completed. Stream pollution also is prohibited and this introduces problems in the disposition of waste material. These are recent developments coming as a result of strip-mine expansion. Reasonable regulation is not fought by mining men. However, the trend is toward so governing affairs from within the industry that outside regulation will be unnecessary. This is always a wise policy and operators in the region usually deal with the public in their areas of operation in a fair and dignified manner. A few years ago these problems were not so pressing, but today they must be faced realistically.

Aggressive conservation promotion also requires a good portion of the strip-mine operator's time and energy. Reclamation of spoil areas will be an urgent issue as the disturbed areas increase in size and prevalence. Definite projects for the use of such land, at a profit to the owner, are underway. Refilling of pits is a regular practice of a growing number of companies, and this will tend to eliminate the industry as a target for more regulation.

As time passes, a greater portion of anthracite production may be expected to come from open-pit mines, since natural conditions make deep mining in the region costly and difficult. The stripping industry came of age during the recent war and provided the extra fuel needed in a minimum of time. The lessons learned and applied during this period of accelerated growth insure the position of anthracite stripping as a long-term enterprise for the recovery of a valuable mineral resource.

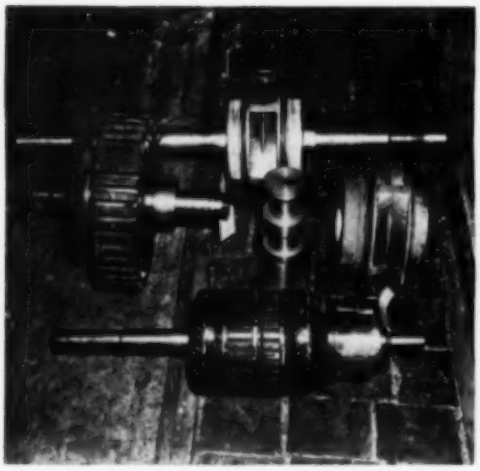


FIG. 1—TYPICAL WORN MACHINE PARTS rebuilt by metalizing a large Pennsylvania mine with considerable savings in time and money.

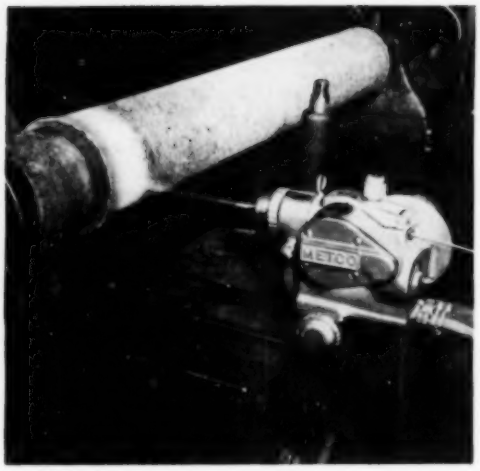


FIG. 2—FOR SPEED AND VERSATILITY, this gun sprays 21 lb of steel an hour and can spray any metal available in wire form.

How Metalizing Cuts Costs

Speed and Versatility, Improved Service and Prevention of Distortion Advantages of Metalizing for Low-Cost Repair of Worn Parts—Equipment Needed, Methods Recommended and Results to Be Expected

JOHN E. WAKEFIELD
Metallizing Engineering Co., Inc., Long Island City, N. Y.

WHEREVER YOU GO in the coal-mining industry — Pennsylvania, West Virginia, Illinois, Utah, Wyoming—you hear more and more reports on the spread of metalizing. There is a reason. A metalizing gun is a fast and versatile "putting-on" tool. Whether it's emergency repair or long-term maintenance, the process offers real savings in time and money. Widest use today

FIG. 4—GAS-FLOW METER permits even a green operator to obtain proper flame.

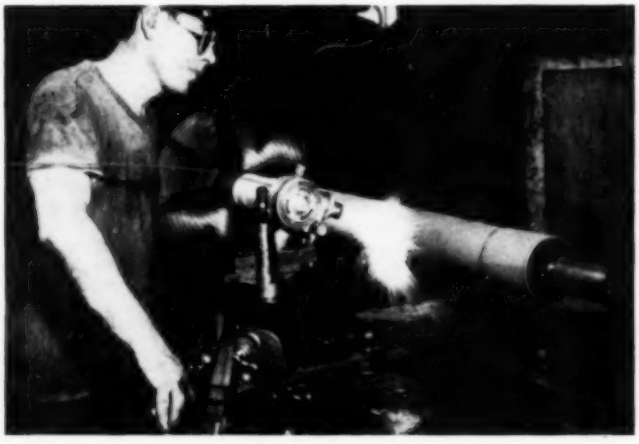


FIG. 5—METALIZING THIS MOTOR AXLE cost about 35% of the price of a new one. Three good-sized jobs a month will pay for even the largest metalizing unit in a year.

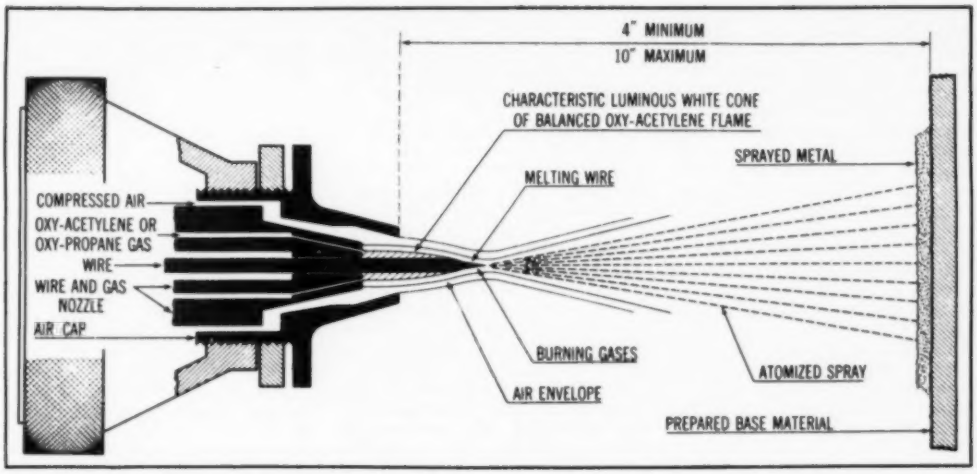


FIG. 3—HOW A METALIZING GUN WORKS. Metal wire drawn by air-operated feed rolls into the base of a circular flame is melted and driven at high velocity onto the work. While oxyacetylene normally is used, the unit can burn any common fuel gas and oxygen.

is for rebuilding worn machine parts, such as the group shown in Fig. 1. This group is typical of the work being done in a large Pennsylvania mine.

Metalizing offers more than a fast and inexpensive way of rebuilding worn parts. Frequently, they can be improved as well as salvaged. Take the pump shaft in Fig. 1 as an example. When the packing sleeves are worn, they can be rebuilt with a medium-chrome medium-carbon stainless steel. Coatings of this material are hard and corrosion-resistant and wear for a very long time. That means longer service between repairs and usually a substantial saving in packing as well.

Sprayed metals almost always outwear the same metals in ordinary form. They're harder. Their lubricating qualities are better. In fact, their ability to absorb and hold oil can be a very important matter with such parts as chain-conveyor tail shafts, which are hard to keep lubricated and are subject to rapid wear as a result.

The low heat of metalizing is another advantage. Parts being sprayed seldom heat above 250 F. That isn't hot enough to cause distortion or stresses. No straightening operations are necessary. That factor alone makes metalizing useful in a great many places where the high heat of welding would be bad.

The speed of modern metalizing guns and their versatility are the greatest advantages. The unit shown in Fig. 2, for example, sprays over 21 lb of steel or stainless steel an hour. Compare that to welding. It also sprays any metal available in wire form—from tin or babbitt with low melting points to stainless steel and even molybdenum, which has a melting point above 4,500 F. The gun will handle any size wire from 20 B&S gage up to 3/16 in in diameter, and can be easily adapted to use any common fuel gas and oxygen. It usually uses acetylene, but can use propane, hydrogen butane, manufactured or natural gas as desired.

These, then, are the advantages of metalizing. They've been proved quite definitely over the 20 years that the process has been used for rebuilding worn parts. What is needed in the way of equipment? What does it cost? How long does it take for it to pay for itself?

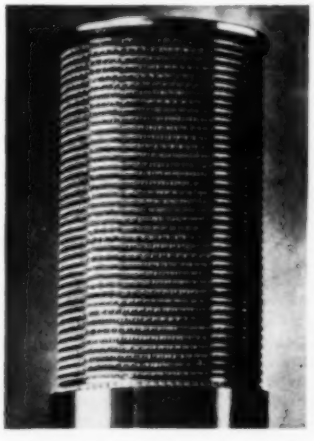


FIG. 6—A SMALL SHAFT prepared by threading ready for metalizing application.

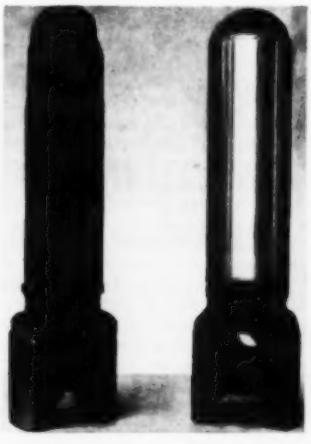


FIG. 7—METALIZED PUMP PISTON (right) originally was as worn as the other.

EQUIPMENT

Air Compressor—To begin with, all modern metalizing guns use compressed air. In most instances, it serves two purposes. Air drives

a turbine operating two wire-feed rolls. These draw the wire continuously into the rear of the gun. At the front of the gun it passes into the base of a circular flame, where it is melted. The other use of the compressed air is in the spraying operation itself. The air does not atomize and spray the metal but it does control the shape of the hot gases so that they shear off metal as soon as it is melted and drive it at high velocity onto the work.

This double use of air means that a compressor of suitable size is the first requirement for metalizing. Many shops have air for other purposes. If they don't a compressor must be obtained. You can't metalize without it. Size of the compressor varies all the way from 3 to 15 hp or more, depending on the type of gun being used. The unit shown in Fig. 2 takes 35 cfm. Several guns available use 25 to 30 cfm. The most recent one takes only 10 cfm. This is accomplished by some sacrifice in spraying speed, but the gun offers all the other advantages.

In determining air requirements, the following may be helpful as a guide. First, find out how much air the gun being considered needs. Then allow about 4 cfm of air actually delivered per horsepower. That means a 3-hp compressor for a gun using 10 cfm and 15 hp for a gun taking 25 to 35 cfm.

Metalizing Equipment—In a metalizing installation, the minimum equipment needed to do good work consists of the gun, an air filter and regulator, a pair of two-stage regulators for gas and oxygen, a wire control and a set of hoses—five items in all. The four accessories are standard for practically all units. Therefore, the cost of a minimum installation varies with the type of gun used. There are several other useful accessories which should be included wherever possible. They're usually well worth the small additional cost.

For a large mining operation, with a good many armature shafts, locomotive axles, tipple shafts, pump-packing sleeves, impeller hubs, and so on, a good workable set-up would consist of a high-speed gun and seven accessories. The large guns, like the one in Fig. 2, not only spray faster but they're more nearly automatic and therefore easier for operators to use. Besides the four accessories listed previously, the installations should include a gas-flow meter unit, a siphon air blast for keeping critical work very cool and a rotary shaft-preparing tool.

The gas-flow meter unit deserves special attention. It eliminates guesswork in obtaining the proper flame for metalizing with any particular wire. A typical unit is shown in Fig. 4.

Adjustment is made by manipulating the pressure-regulator handles until the floats correspond with the figures in the tables. That provides an exact flow ratio between the gas and oxygen and a perfectly balanced flame. A balanced flame means 10 to 20% higher spraying speeds. More important, it means better and more consistent coatings. Even a green operator can obtain exact flame balance and duplicate his settings time after time.

But let's get back to the proper installation for a large operation. The heavy-duty high-speed gun and seven accessories make it possible to do the best work and any kind of work in the mechanical field. Cost of this equipment would be somewhere between $1,000 and $1,200. It would accomplish very fast repairs and give the lowest cost per pound of metal sprayed.

For a medium-sized operation with fewer machines to service, a good set-up would include a smaller gun and six accessories. The one eliminated would be the siphon air blast unit. Smaller guns don't heat up the work as much as the largest type. Therefore, the air blast for cooling is not usually needed. The installation would cost between $900 and $1,000. Spraying speeds are somewhat lower, but run 8 to 10 lb of steel or stainless steel per hour.

For a small operation, doing occasional work, the smallest gun using only 10 cfm of air would be recommended, with five accessories. Such a unit would cost around $650. Spraying speeds are lower still but are high enough to be economical. Take a worn armature shaft, for instance. It's quite a job to make a replacement. The old shaft has to be pressed out of the winding very carefully. Another one must be obtained or made, pressed back in and straightened. All too often, a rewinding job is necessary also. With metalizing, the shaft is placed in the lathe winding and all, roughed up, sprayed and finished. There's no damage to the winding and no straightening operation. Thus, even with a low-speed gun, time and money have been saved and production restored with the least loss of time.

The installations discussed can be expanded as far as you like, of course. However, the equipment covered enables a shop to turn out good work at an economical cost. Incidentally, all three types of metalizing guns mentioned spray all kinds of metals. Consequently, a shop is not sacrificing versatility by selecting a smaller gun.

The figures show that the cost of a metalizing installation is not low. How you get that money back is the next question. Few shops or mines have enough of any one application to justify purchase for that use alone. You have to take into account a number of different types of applications that will come up. Undoubtedly, locomotive axles, armature shafts and pump parts are the three most important types as far as annual savings are concerned. But don't forget the great variety of gear fits, bearing-race fits and large shafts in tipples, hoists, preparation plants, and the like.

The cost of metalizing almost any shaft is very small compared to the cost of replacement, often running as low as 10%. The average is probably around 20 to 25% in coal mine work. For example, metalizing the motor axle shown in Fig. 5 cost about 35% of the price of a new one. Metalizing the armature shaft from a Reliance motor on a Joy 11 BU loading machine costs about 14% of a new one.

It's been pretty generally proved that three armature shafts, locomotive axles or pump shafts a month —in other words, three jobs a month of this general kind—will save the cost of even the largest installation in one year. The majority of companies feel that capital equipment should pay for itself in 3 to 5 years. Therefore, any installation that saves its cost in one year is a mighty good investment.

Actually, there are many cases where mines have reported much greater savings than this.

Before leaving the subject of practical metalizing installations and their cost, one other thing should be mentioned. The principal manufacturers of equipment include very complete instructions with their guns. At least one company goes far beyond that in supplying personal instruction at the customer's shop, in addition to periodic service calls. Between personal instruction at the beginning and a careful study of the manuals, an operator can become quite expert in a fairly short time. Where a gun is properly used and taken care of, there's very little that can go wrong with it nowadays.

In considering an installation,

try to estimate the average number of jobs it would handle in a month. Then, try to obtain the next largest unit. That may sound like odd advice, but the chances are strong that more and more jobs will turn up as the equipment is used and you determine what can be done with it. The bigger the gun, the faster it sprays and the easier it is to use.

Selection of the right metalizing gun isn't the only thing necessary for good metalizing work, of course. A knowledge of structure of sprayed metals and their general purpose helps. Probably the two most important factors for successful metalizing are: (1) preparation of surfaces and (2) choice of the right metal for the particular job and the conditions under which it will operate. There are a few useful do's and don't's as well.

SPRAYED METALS

It's important to realize in the beginning that sprayed metals are entirely different from any other forms of metal. They're separate and distinct engineering materials. They behave differently in service and most of the tests commonly used to determine metal characteristics don't mean much when applied to sprayed materials. Realizing that is the first step toward understanding them.

Structure—When a molten globule leaves the gun, a very thin film of oxide forms around it even before it strikes the work. When it does land, it flattens out. Its surface area is greatly expanded and the oxide film is broken. This exposes pure molten metal again. This bonds to the base and immediately forms a new oxide film. When another particle lands, the process is repeated. The exposed molten metal bonds to the oxide on the first particle. This metal-to-oxide-to-metal bond is called oxide-cementation and is the main thing that holds particles together. There's a little welding, too, and a little physical interlocking of particles.

Sprayed metals, then, are made up of tiny flattened metal particles, surrounded by very thin films of oxide and with voids or actual vacant spaces between particles here and there. They're porous, have reduced tensile strength and low elongation. Particles usually are much harder than those of the same metal in ordinary form as a result of a chilling effect from spraying.

Purpose—Sprayed metals are used solely for surface treatment of other materials. In the coal mines, of course, that means putting metal back on surfaces from which it has worn away. You don't need metals that add any great amount of strength, but you do want hardness, good lubrication and resistance to wear or corrosion or both.

METALIZING LIMITATIONS

Because of the peculiar structure already described, there are three types of mechanical parts on which metalizing should never be used.

Impact—Metalizing should not be used on any part that has to withstand direct impact, such as the valve seats of internal-combustion engines. It cannot be used on punches and dies and some kinds of cam surfaces. Of course, there aren't many parts that have to withstand impact beyond those listed. Staying away from them will help to avoid predictable failures.

Shear—Another type of work to be avoided is that where there would be very great strain on the sprayed metal itself. Threads and gear teeth are typical examples. Stay away from them with metalizing.

Elongation—The third bad spot for sprayed metals is on ball- or roller-bearing races; that is, the surfaces on which balls or rollers actually run. They tend to stretch the surface and sprayed metals do not stretch well. Of course, it's perfectly all right to build up a shaft for a bearing-race fit, or the ball end of a motor housing. Here, sprayed metal doesn't have to stand up under the balls or rollers themselves.

These, then, are the three types of work where sprayed metals cannot be used. Knowing the limitations of a process really helps to avoid the places where it cannot hope to work satisfactorily. There aren't many such places in the average mine, but it's well to have them in mind.

SURFACE PREPARATION

The most important single factor in good metalizing is correct preparation of surfaces for sprayed-metal coatings. There are probably 8 or 10 different methods which are useful. All of them have two things in common: they clean the surface and they leave it roughened in such a way as to provide anchors for the particles to key into. For most work in the average mine, a thorough knowledge of two methods is enough to take care of almost any kind of work that will come up.

Threading—The method that produces the strongest bond is known as the METCO. It consists of threading and the use of a special rotary shaft-preparing tool. Threading can be done in several ways, though the METCO method itself specifies square threads. The best way for most purposes is to use a 60-deg threading tool and cut a 24- to 30-pitch thread. It's a good idea to round the point of the tool a little to avoid leaving fracture lines in the shaft. Once the work is threaded, the rotary shaft-preparing tool is run over the threads lightly several times to cut them up still further. This tool is made up of five saw-like blades with teeth set staggered to produce a very irregular cut. A small shaft prepared in this manner is shown in Fig. 6.

Using a square thread produces an even stronger bond for the sprayed metal, but it is slower and usually not necessary. If you undertake to use a square thread, grind the tool 0.045 in wide with corners stoned to leave a little fillet at the bottom of the threads. Cut 16 threads to the inch to a depth of approximately 0.015 in, except for cast iron. On cast iron, cut 14 threads to a depth of 0.025 in.

The thread and rotary shaft tool methods should always be used on interrupted surfaces, such as shafts with keyways and pistons with relief areas. It should also be used whenever a coating of more than 0.050 in is to be applied. It is good practice, too, on all reciprocating parts, such as piston rods, pump plungers or the Aldrich-pump pistons shown in Fig. 7. Incidentally, Fig. 7 is an interesting illustration. The piston on the left looks almost beyond repair. The other one did too before it was metalized with bronze. In this instance, the metalizing job cost about 20% of the price of a replacement.

The threading and rotary shaft tool method should be used on most reciprocating parts because wear is along the surface instead of around. That tends to pull the coating and the threads prevent any damage from that kind of action. Another reason is that it is generally advisable to put heavier coatings on reciprocating parts anyway. Pump plungers and rams, particularly, need about $\frac{1}{8}$ in of sprayed metal on a side when finished to prevent pressure from working through the coating.

Self-Bonding Undercoat—The newest method of preparation is

FIG. 8—CRANKSHAFT BEARING HOUSING metalized at 15% of new cost.

FIG. 9—METALIZING a 9-in-diameter by 17-in diesel-dragline piston.

FIG. 10—METALIZING this breaker-head drive shaft prevented a lengthy shutdown.

much faster, far less expensive and quite satisfactory for all surfaces where the coating is 0.050 in or under and is not interrupted by a keyway or other break. It consists of spraying a special high molybdenum alloy which bonds itself directly to the base. Spraying is done with the regular metalizing gun and the new alloy will bond tightly to smooth and even high polished surfaces provided they're perfectly clean. The alloy itself is rather expensive, running around $10 a pound. For that reason, it is used primarily as an undercoat for other sprayed metals. As an undercoat, only 0.0015 to 0.002 in is needed. Consequently, materials cost is very low.

The best way to prepare a worn bearing surface, for example, would be to take a light, fast roughing cut. This cleans the surface and exposes clean new metal. It also increases the bonding area by leaving it somewhat irregular. It isn't necessary to cut threads. Just take a roughing cut to clean the surface and more or less even it up.

The method saves a great deal of time by eliminating several machine operations. Less metal has to be sprayed and a smoother finish results in less finishing time as well. On average shaft work, the total cost of metalizing, including preparation and finishing, is cut from 40 to 50% below that of previous methods.

Remember, however, that the material should not be used under very heavy coatings or where the surface is interrupted. It cannot be used on parts made of copper, brass or bronze, either, because the molybdenum alloy will not bond to those materials. You can spray copper and its alloys over it, however. On steel surfaces, stainless steels, cast iron, monel, nickel, magnesium and most aluminum alloys, it bonds extremely well.

The place where the new method really changes the picture of metalizing is on fit sections. Very little metal need be added, as a rule. Therefore, it's quite economical to use the self-bond material alone. Several instances have been reported where bearing-race or gear fits were cleaned with emery, sprayed with the alloy and the race pressed back on without any finishing machine work. The spraying had to be done carefully and the size checked often, but it's well worth while to eliminate finishing completely.

So much for preparation in the average mine machine shop. These two methods will take care of almost any application that will come up. Remember that a surface must be clean and free from oil, grease, rust or dirt. And it must be left properly roughened. One other point in preparation: Do the spraying within 4 hr after the preparation is completed. Otherwise, there is a chance for dirt or oxide to get on the part again.

METAL CHARACTERISTICS

Because they are used purely as surface materials, the important factors in selecting a metal for a particular job are its hardness after spraying, lubricating qualities, resistance to wear, corrosion resistance and machinability. One other factor that's important in sprayed metals is their relative shrink as they cool. Some of the characteristics are general for almost all sprayed metals. Let's look into them first.

Lubrication—All sprayed metals are porous. Because of that, they absorb and hold fairly large quantities of oil. That, in turn, makes them run with less friction than the same metals in ordinary form. It's been proved many times in service and several times in the laboratory that any sprayed metal will lubricate better and has less tendency to heat up or seize.

Hardness—Tested for hardness by any common method, sprayed metals appear softer than ordinary ones. These tests are entirely misleading as far as indicating the probable resistance to wear. All common tests depend on penetration. You can certainly penetrate a porous surface more deeply than one that isn't porous. Actually, the more important point is whether the individual particles in a metal are hard or not. Particles of sprayed metal are considerably harder than those of ordinary metals because of the chilling effect of spraying. In addition, the carbon steels pick up more carbon from being sprayed.

Wear Resistance—Between their good lubricating qualities and the hardness of individual sprayed particles, sprayed metals outwear the same metals in ordinary form time after time. That's important to the coal mine, because by spraying a worn shaft with, say, 0.25- or 0.80-carbon steel, the shaft will wear longer than it did originally. That means money saved and far less frequent interruptions of production.

Shrink—Some metals tend to shrink more than others. While sprayed coatings seldom heat up above 250 F, there is some shrink as they cool to room temperature. Heavy coatings of high-shrink metals will naturally shrink quite a little, with the result that the coating will sometimes crack. It doesn't happen very often, but it's something that should be known. In general, the lower the carbon content in the steels or stainless, the higher the shrink. Carbon steel of the 0.10 class shrinks 0.008 in per inch, for example, whereas 0.80-carbon steel shrinks only 0.0014.

In the stainless steels, 18-8 type shrinks 0.012 in per inch, whereas medium-chrome medium-carbon stainless shrinks only 0.0018. Hence the high- and medium-carbon and stainless steels are better for heavy coatings than the really low carbon steels or 18-8. However, it should also be borne in mind that the high- and medium-carbon steels and medium-chrome medium-carbon stainless are hard and have to be ground for finish.

It sometimes happens that a heavy coating is needed but that no grinding equipment is available. Here, it is advisable to build up to within 0.040 in of finish size with 0.80-carbon steel and finish off with a machinable metal like 0.10-carbon. This avoids heavy coating with very high shrink material and still provides a machinable surface.

The preceding pretty well covers the general characteristics of sprayed metals as far as they are important to the mine shop. Let's see what individual metals are available for ordinary mine repair work and what they have to offer.

There are three carbon steels available for spraying: 0.10, 0.25 and 0.80. The 0.10-carbon steel can be machined with ordinary tools and will generally wear about 1½ to 2 times as long as ordinary mild steel. Its one drawback is its high shrink, and even that is not too important with coatings less than 0.050 in thick. It also is possible to machine 0.25-carbon steel with ordinary tools, but it can be given an even better finish with cemented-carbide tips like Carboloy or Vascoloy. It wears even better than 0.10 and has a lower shrink. It's pretty safe to use up to 0.100 in in thickness. Grinding is necessary with 0.80-carbon steel, as it is very hard and wears extremely well. It has the lowest shrink of any common metalizing material and can be built up to almost any thickness. Several instances have been reported where coatings of 0.80-carbon steel have been built up to ¾ in and even ½ in thick. All of these metals lubricate very well.

When it comes to packing surfaces on pump sleeves, turbine shafts and pump plungers, the best metal to use is medium-chrome medium-carbon stainless steel. It has good resistance to ordinary corrosion, is as hard as 0.80-carbon steel and is even tougher in service. In fact, it is highly recommended where there is severe wear or abrasion and where the part must stand both wear and corrosion. Almost all pump packing sleeves are metalized with this material.

There are five bronzes available. The best one by far is a fairly new aluminum-iron bronze. It is hard and wears almost as well as cast iron. It has excellent resistance to corrosion and is strong and tough. One of its greatest advantages is the fact that it can be machined to a very high finish with almost any kind of tool. The other bronzes are of the more ordinary sort, such as Tobin-type, commercial, phosphor and manganese. All except the Tobin bronze have very limited use.

For other corrosion jobs, there are nickel, monel and 18-8 type stainless steel. They spray well and take a fair machine finish. However, they're all rather porous when sprayed. If you want to use any of them on parts running in liquids under high pressure, they can be effectively sealed with tung or linseed oil. Raw tung oil or either raw or boiled linseed oil, mixed with 5% by volume of cobalt liquid dryer, gives the best results. The part should be dipped or painted with the oil while still warm (but not hot) after spraying. Be sure to saturate the coating and permit it to dry thoroughly. Do this before machining.

Those are the principal things to consider in selecting a metal for a particular job. Probably the most important one is shrink. It can cause trouble if you don't have its effects in mind.

FINISHING CONSIDERATIONS

Just a word about finishing sprayed metals. In machining, it's a good idea to set the tool a little above center to reduce clearance to a minimum. That results in a burnishing effect with all sprayed metals. Ordinary tools can be used for most machining operations, but carbide tools will give a better finish on any sprayed metal.

In grinding sprayed metals, there is a tendency for them to "load" the wheel. For that reason, it's better to use a wheel with fairly coarse grain and low bond strength. A wheel similar to Carborundum Co.'s C36-K4-VE Carborundum Vitrified or Norton Co.'s 37C46-K5V Crystolon Vitrified will grind all sprayed steels and some other metals quite well.

OTHER USES

Quite a number of typical coal mine applications for metalizing have been mentioned previously. A few others have been reported which may be interesting.

Fig. 8 shows a crankshaft bearing housing from a Goodman shaker-conveyor drive. Worn on the inside diameter, it was rebuilt by metalizing with 0.25-carbon steel and machined to standard size. Cost of the work turned out to be about 15% of the cost of a new unit.

Fig. 9 shows the metalizing of a 9-in-diameter by 17-in piston from a diesel dragline used at an Illinois operation. The piston was prepared by the threading and rotary shaft tool method. Iron wire was used in spraying, although 0.25-carbon steel would have been a better selection. The piston was built up ⅛ in on the radius and machined to standard.

Fig. 10 illustrates an interesting case. The mine was faced with a serious shutdown when the drive shaft on the breaker head failed. The unit weighs about 6,000 lb and would probably have cost close to $1,200. The shaft was prepared by an electrical method which deposits rough crater-like nickel particles on the surface. This method was selected instead of the two described previously because the shaft was so badly worn. Therefore, it was felt that it would be dangerous to weaken it further by undercutting or threading.

After preparation, it was metalized with 0.25-carbon steel and finished in a large boring mill. The metalizing operation not only saved a good deal of money but prevented a long and very costly shutdown period.

There are a good many places where the average mine can use metalizing to advantage. Locomotive axles, armature shafts and pump parts are the most common and offer the greatest annual savings. However, there are many other occasional jobs from the power plant to the coal breaker or chain conveyor which can help make an installation pay off in fairly short order.

Screening to Remove Degradation Integrated With Reclamation in . . .

PORTABLE RECLAMATION UNIT used at Wildwood consists of a swinging conveyor, shaker screen and two 35-ton bins for loading trucks with degradation-free lump and slack. The coal is picked up by a shovel with special dipper.

CONVERTED UNDERGROUND LOADER, shown waiting for truck at the left, is equipped with a single chain-and-flight conveyor, screen and side-discharge belt with hopper for disposing of the degradation during the loading process.

TRUCK LOADING with converted underground loader (left) and portable unit (right).

WILDWOOD STOCKPILING INSTALLATION, with truck dumping on black-top surface to start the operation. The final step in storing is dumping onto the board-covered slope at the left and then extending the pile out.

Wildwood Stockpiling

Storage and Loading Facilities Insure Low-Cost Stocking and Efficient Degradation-Free Reclamation

COAL STOCKING at the Wildwood mine of the Butler Consolidated Coal Co., Wildwood, Pa., proved to be a means of greatly increasing the running time of the operation. Consequently, company officials did a lot of visiting at coal-stocking plants before deciding on the type of permanent equipment to install. As a result, the machinery they installed differs from that usually selected. The total investment is relatively low considering the preparation job done in reclaiming the coal and the fact that the storage capacity is nearly 100,000 tons. Company officials are well pleased with the results.

To provide a place for stockpiling, a level space was graded on the floor of the valley as close to the mine as possible, or about ¼ mi from the tipple. The site was paved with black-top and the flanking bank or hillside was graded to an even slope and faced with wood. The difference in elevation between stockpile pavement and a paved highway that parallels the top of the wood-covered slope is 35 ft. That is the maximum depth of the pile. To reduce breakage when stocking onto an empty area is begun, the end-dumping trucks hauling from the tipple approach on a road at the lower level and dump the coal directly onto the pavement. After completing this first layer, the trucks begin hauling on the high road and dumping onto the wood-covered slope. As the pile builds to the top, the trucks start backing out onto it to dump their loads, thus increasing the width.

Reclamation loading into trucks includes screening. The equipment consists of several Joy 5 BU loading machines rebuilt in the mine shop for this special purpose. The original hoppers on these old-type underground loaders were removed and single straight chain-and-flight conveyors were substituted for the two conveyors originally employed. A bar screen with openings corresponding to the size of coal being loaded is installed in the bottom of the conveyor near the upper 54 in. This screen is vibrated by eccentrics struck by the rollers of the chain conveyor. The fines fall into a small hopper and are cast to one side by a short lateral belt conveyor attached to the machine and driven by a separate motor. This Joy loader is used for loading 3x5-, 2x3- and 1-in nut.

Lump is handled by an Osgood crawler-mounted shovel with a 1-yd dipper specially designed and built in the Wildwood shop. This shovel places the coal in the hopper of a portable reclamation unit consisting of an elevating chain-flight conveyor, shaker screen and storage bins from which the coal is drawn into the trucks. The bin is mounted on double-flanged wheels riding on 30-lb rails supplied in short sections and laid on 2x6x24-in wooden blocks without spikes.

The upper end of the 50-ft elevating conveyor is pivoted at the top edge of the portable bin while the lower end is supported on caster wheels. Consequently, the conveyor and its feed hopper can be swung in an arc, thus reducing the frequency with which the entire unit must be moved. The conveyor discharges to a 35-ton bin, after which the coal is screened by a Godfrey shaker with 1½-in lip-screen plate. The lump coal, cleared of degradation, goes into the truck while the fines are elevated to another 35-ton bin by a conveyor of the Redler type built in the mine shop.

Usually, the stockpile consists of coal to be reclaimed for local domestic sales to truckers. It has not been uncommon, however, to load 1x1½- and 1-in nut-slack to railway cars from the stockpile. Wildwood mine is in the Thick Freeport seam 15 mi in a bee-line north of the heart of Pittsburgh. F. G. West is vice president and W. P. Vance is general superintendent. P. W. Dobson, master mechanic, and C. A. Eskbaugh, outside foreman, were responsible for the design and construction of the units.

FACTORY-BUILT HOMES combining planned design, sound construction and low maintenance . . .

Modern Housing for Miners

Comfortable, Attractive Housing Important Inducement in Getting and Holding Good Workers—Designs and Features Variable — Erection by Factory Crews Cuts Costs—Good Planning Enhances Community Appeal

GEORGE E. PRICE
Vice President, National Homes Corp., Lafayette, Ind.

INFORMED MANAGEMENT, well aware of the problems of keeping men contented as a big step toward more successful operation, is devoting more and more attention to the importance of housing for workers and their families. "Hang On to Your Miners!" read the headline of one article lamenting the fact that many mines are not producing their rated tonnage because of lack of workers.

"The industry can attract more and better men only by making the industry more attractive," the article concluded. That statement is true as far as it goes, but a further and vitally important consideration is making mining *communities* more attractive.

The one development in modern building offering the most in a practical way to obtain proper and attractive housing is prefabrication. Multiple production of houses in an efficient factory employing skilled workmen, utilizing the most up-to-date machinery, and manufacturing from tested materials provides better homes at lowest cost.

A community of these well-built homes in the vicinity of a mine can be a most persuasive argument to the type of man whom management wishes to attract—the industrious family man who wants a job along with the opportunity to have for his wife and children a comfortable, modern house. Comfortably housed, his family can enjoy better health and make the most of facilities for education, recreation and advancement. Thus, the worker feels he is living in the American way. With these advantages to consider he will place more value on his job.

Even the serious-minded single man will think twice before he moves from a comfortable community.

The mine which cannot offer even fairly good housing to prospective employees has one big strike against it at the outset. The mine which *does* have good housing is in a much better position to hold workers and enjoy good personnel relations, which pay off in increased production and more profits.

Present prices for multiple produced or prefabricated houses are reasonable. It is possible to erect an adequate number of simply-designed but comfortable modern homes at a low cost. And, because the homes are well-built, they have a low maintenance cost.

Organizations such as that with which the writer is affiliated have developed industrial housing that is proving highly satisfactory in many mining communities. The variety in size and price range makes them adaptable to large and small families with various levels of earning power. Optional features such as those available in National Homes are another advantage in good industrial housing. These features include porches, garages, type of heating, extent of plumbing and wiring. They also make possible further breadth in price range when desirable.

Regardless of price and size of the individual houses, factory specifications insure full value for every building dollar. The manufacturer's field-construction crews reduce an item of great expense—field cost. Trained men, working under experienced supervision, take over all details of erecting the houses and applying finish painting. This

ARE ERECTED ON THE SITE by manufacturers' crews at reasonable costs to . . .

ATTRACT INDUSTRIOUS WORKERS by offering pleasant, attractive, comfortable family living.

greatly simplifies the extensive and complex operation usually involved in providing group housing.

In the event the mine or industry is moved, the homes also may be moved to another site. Too, their substantial construction insures a high resale value.

All the foregoing relates to the value of prefabricated homes from the viewpoint of the mines and the men. Let us take a look at things from the viewpoint of the miner's wife.

The housekeeping efficiency made possible by the design of these neat, well-built homes is a constant source of satisfaction to the homemaker. She can enjoy many new conveniences, has an incentive to keep her home attractive inside and out and prepare better meals, and she has more time to be a companion to her husband and children. In few cases will a man choose a job where housing is poor and squalid, as compared to the job that assures him better living conditions. His wife has volumes to say on that subject.

Planning of the community as a whole should, of course, be one of the first steps in designing it for more and better living. Ample sized lots should be provided, well-landscaped and enclosed by hedges or fences. The stigma of "row houses" can be eliminated by grouping the homes and adopting the use of planned "set-backs." Harmonious color schemes and the location of homes of similar architectural design in different areas should be worked out in advance.

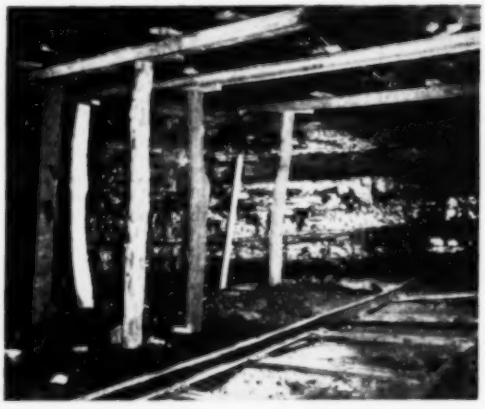
Playground areas need to be designated, streets laid out with safety measures in mind and off-street parking provided. Shopping centers must be in locations conveniently accessible from all parts of the community. If educational and religious facilities are not close by, the establishment and growth of these two most essential institutions should most certainly be provided for.

With the foregoing requirements met and the necessary public utilities available, the community could be acceptable to FHA for long-term insured mortgage financing, making possible home ownership with low down payments and low monthly payments like rent.

Get your community of homes and you'll get the miners and their families. And the miners will be more contented and better workers because they are better housed.

New Hanna Mine Plans Permanent Drainage, Timbering and Development

BUILT IN 1942, the Piney Fork plant since has been equipped to reduce the ash in fine coal and do a complete job of drying.



ROOM FACE ready for track cutter. Setting the steel jack on an angle makes it easier for the loading machine to clean up.

ONLY BUILDINGS at the new portal are the fan house (left) and a substation outside the picture at the right.

MAN-TRIP of 20 cars, including a caboose at each end, about to enter the new Henderson Run portal.

SUMPS ARE INSTALLED every 2,000 ft as the main entry advances and are equipped with borehole pumps and 6-in lines.

INSTALLING PERMANENT 6-in discharge line at a point within 400 ft of the face of the main entry.

NEW STEEL TRESTLE 780 ft long and 90 ft high is part of the 2-mi outside haulway built from the Piney Fork preparation plant to the new Henderson Run drift opening. The 42-in-gage haulway has 60-lb rail laid on 5x7-in by 6-ft ties on a limestone ballast.

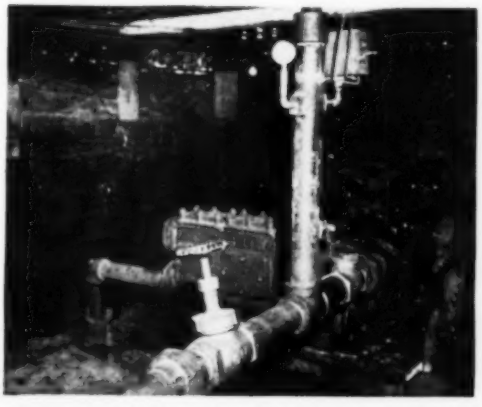
Developing Henderson Run

Permanent Facilities Installed as Mine Advances, Eliminating Cost of Temporary Work—Emergency Water-Handling Facilities Included in Development—90% of Room Timber Recovered—Wide-Work Crews Average 20 Tons of Cleaned Coal per Man-Shift

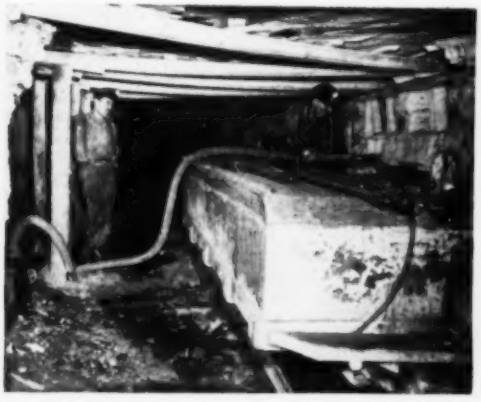
By J. H. EDWARDS, Associate Editor, Coal Age

THE FACT that a mine can be systematized like a factory though the roof is bad and the water influx large and irregular has been demonstrated at the new 8,000-ton Henderson Run mine of the Jefferson Coal Co. (a Hanna affiliate), Piney Fork, Ohio. In this new operation, now producing 5,200 tons of cleaned coal per day, no temporary work is done. As the main entry is driven a permanent drainage system is installed, the main air course is scaled, arched and gunited, and the main haulways are graded, permanently timbered and laid with heavy rail. Wide-work crews produce 20 tons of cleaned coal per man-shift. An automatic water system has reduced to one-sixth the time required for filling spray cars and insures clean water.

Modernization of the Piney Fork

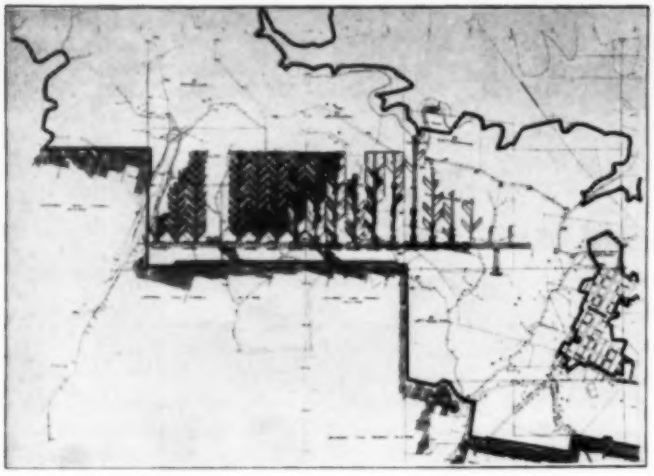


PRESSURE on 7 mi of fire and sprinkling line is maintained by 5½x8 triplex plunger pump with automatic control.

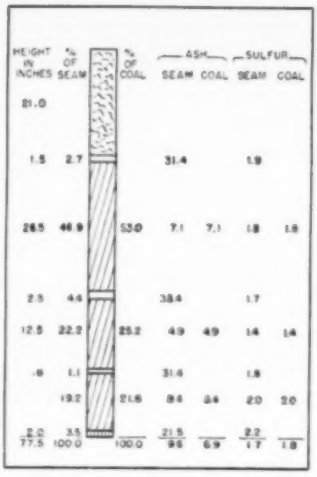


CUTTING-MACHINE WATER BOXES are filled with filtered water in 5 min in the sections with the new automatic system.

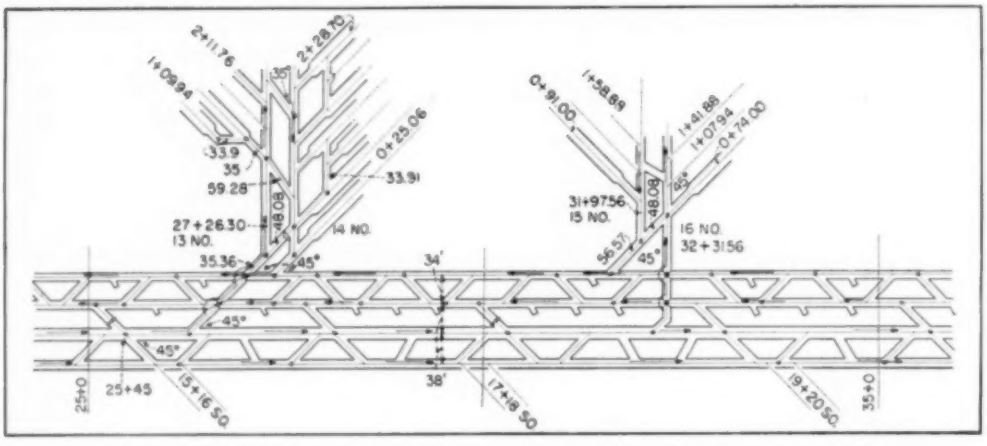
Henderson Run Mining Methods Reflect Advance Planning for Efficiency



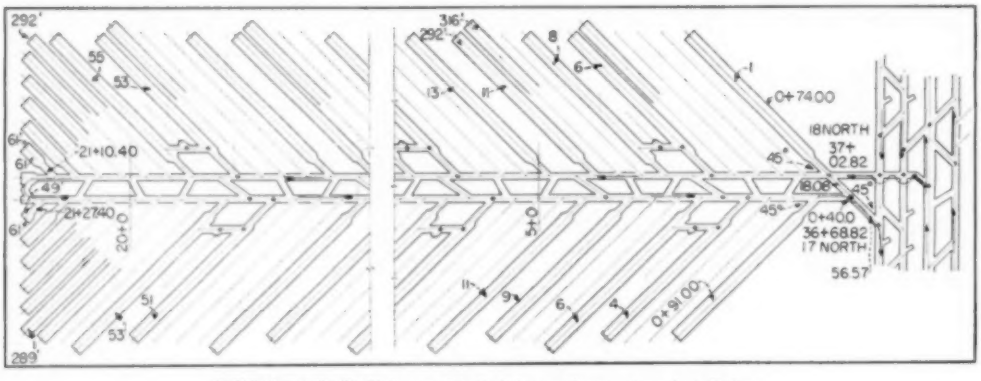
HENDERSON RUN territory is within the heavy border.



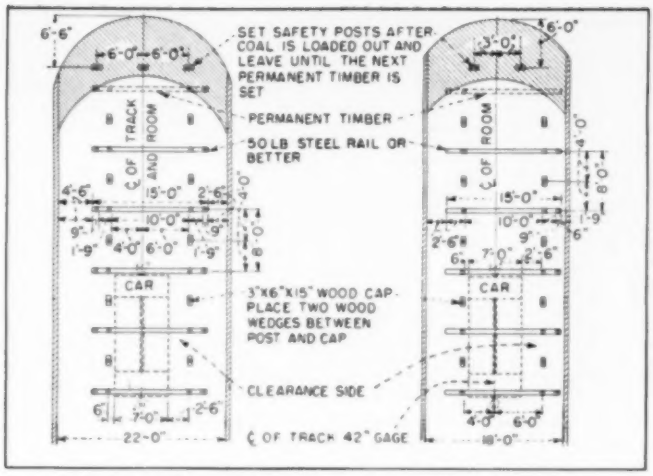
CHANNEL SAMPLE, Piney 1, June 28, 1949.



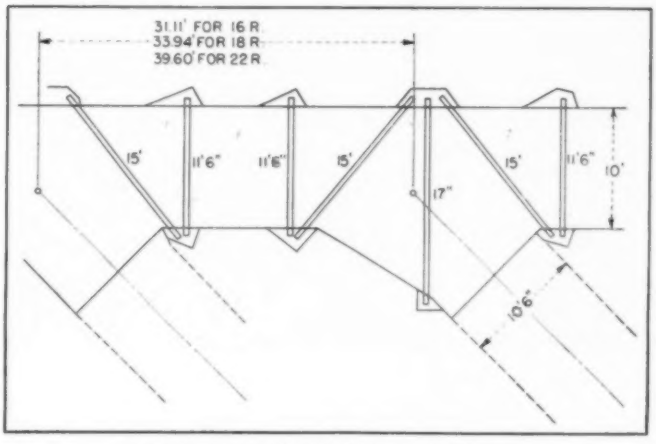
MAIN-ENTRY DEVELOPMENT PLAN, with two haulways and two air courses. The room entries are spaced 470 ft apart.



TYPICAL PANEL PLAN for panel 2,150 ft long with rooms turned at 45 deg.


SET SAFETY POSTS AFTER COAL IS LOADED OUT AND LEAVE UNTIL THE NEXT PERMANENT TIMBER IS SET
PERMANENT TIMBER
50 LB STEEL RAIL OR BETTER
3"x6"x15" WOOD CAP. PLACE TWO WOOD WEDGES BETWEEN POST AND CAP
CLEARANCE SIDE
℄ OF TRACK 42" GAGE
TRACK AND ROOM
ROOM
CAR
22'-0"
18'-0"

STANDARD ROOM TIMBERING using 15-ft recoverable steel-rail crossbars.



TIMBERING AT ROOM NECKS in panel development.

property was inaugurated in 1942 with a new washing plant including centrifugal dryers plus a heat dryer of the down-draft screen-type (*Coal Age*, July, 1942). Mechanical loaders already had been installed in the existing Piney Fork No. 1 mine but there was continued progress in other equipment and methods. The old 4-ton cars were replaced by 160 10-ton eight-wheeled Watt cars, a new 21-ton eight-wheeled Differential locomotive was installed, and labor relations were improved by promoting a better understanding between men and management and within the ranks of management itself (*Coal Age*, November, 1946).

To solve the next problem—meeting competition from other coal-producing areas serving the same power-plant fuel markets—nine Deister Concentrator SuperDuty Diagonal-Deck No. 7 tables were installed to reduce the ash content of the minus-3/16-in from 21 to 7½%. The improvements also included Raymond flash dryers to bring the surface moisture of this table-washed coal to 2½% after a preliminary drying to 7½% in the centrifugal units (*Coal Age*, January, 1948). In 1948 a third C.M.I. centrifugal dryer was installed. Recently an experimental Roto-Clone was installed with the idea of ultimately taking all of the dust out of the flash-dryer cyclone-collector discharges.

To serve the new Henderson Run mine, which has a projected life of 20 years and which last year completely replaced the worked-out Piney Fork No. 1 operation, a new outside haulway was built 2 mi from the preparation plant to the new drift opening. This haulway includes a steel trestle 780 ft long and 90 ft high spanning a valley containing the railroad, creek and highway. The 60-lb rail of the 42-in-gage track is laid on 5x7-in by 6-ft ties on a ballast of limestone from a commercial limestone plant operated by the Hanna Coal Co. in connection with its nearby Georgetown stripping.

Man-Trip Cars Are Modern

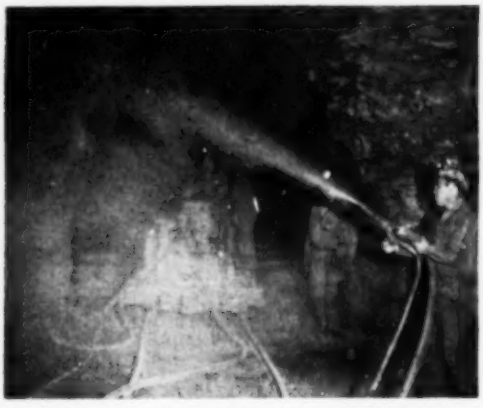
New portal facilities are under construction at the present time. Meanwhile, the men are transported from the preparation plant to the portal in a trip of covered man-cars in which each man rides in a car to which he is assigned. There is a caboose for the shift foreman at the front end, and at the rear for the triprider.

Ventilation, now at a rate of 136,000 cfm against a 2.4-in water gage, is supplied by a 7-ft Ladel fan driven by a 150-hp 4,000-volt motor. Instead of steel relief doors, the fan adit is supplied with 4-in-thick panels of light-weight brick set in weak mortar and plastered on the inside. The only other building at the new opening is a small one containing dc substation equipment.

The seam is the Pittsburgh No. 8, made up, from the bottom to the top, of 27 in of coal, 3 in of slate, 25 in of coal, 1½ to 2 in of bone, of which about 25% sticks to the coal, 12 in of drawslate and 10 in of roof coal. The seam lies practically level and the maximum cover over the territory now being worked is 200 ft.

Eight mechanical units are operated on each of the three shifts. Each unit consists of one Jeffrey 29 U track-mounted cutter with 9-ft bar, one Goodman 460 track-mounted loading machine, one Chicago-Pneumatic No. 473 electric drill and one Jeffrey 6-ton cable-reel gathering locomotive. Equipment for each crew will eventually include a timbering machine. At present the mine is equipped with but one timbering unit, which was built in the Hanna central shops at Georgetown. Four Jeffrey locomotives, comprising two 13- and two 8-ton units, handle swing and intermediate service. The main haul,

Main Air Courses and Haulways Built for Mine Life at Henderson Run



GUNITING AT HENDERSON RUN, with the crew applying the second and last coat of cement to the air course shown at the left ready to open the valves. At the right, the second coat is being shot onto the surfaces.

LOADING ROCK in the main air course—a part of a scaling and arching work preceding guniting.

ARCHED AND GUNITED, this main air course has a large cross-section and will give little trouble over the 20-yr mine life.

MECHANICS' JEEP includes trolleyphone. Main-line, swing and supply locomotives also are equipped with phones.

ENTRANCE to the refuse pile, served by a main haul of 4% and four spurs on 6% grades for a larry-trailer disposal unit.

PERMANENT MAIN-LINE TRACK being laid close to the face. Material in the background resulted from shooting 2 ft of bottom.

MAIN-LINE HAULWAY PROTECTION includes steel crossbars on 4-ft centers on precast concrete legs resting on the coal.

TIMBER RECOVERY in a worked-out room. Steel crossbars are pulled by a locomotive using steel line and hook.

now averaging 6½ mi round trip, is handled by two 21-ton Differential streamlined locomotives, each pulling 24-car trips.

The main entry consists of four headings, one for the inbound track, another for the outbound and two for air courses. There is a crossover from one track to the other every 2,000 ft. Double-heading room entries are turned off the main at 470-ft intervals. They are turned 90 deg and normally extend 2,150 ft. In some instances, however, they will go 2,800 ft to reach the outcrop. As the room entry is advanced, grip cuts are made at each room neck for setting one 15- and one 17-ft timber ready for laying a track switch.

Rooms 18 to 22 ft wide are worked on both sides. They are turned on a 45-deg angle and are driven 300 ft deep. Pillars 6 ft thick are left between rooms, with every sixth room omitted, thus leaving solid-block barriers to head off squeezes and permit recovering timbers and other materials from the adjacent five rooms. Depending on overburden and other conditions, a room may later be driven in the block or a few cuts taken out. In the solid blocks one crosscut is always made close outby for ventilation. Generally speaking, the rooms are mined on the retreat from a panel. However, a few groups of rooms are mined as the entry is advanced.

One crew of nine men develops the main entry and also develops the room entries for several hundred feet. Wide-work as well as combination crews consist of 14 men and a foreman. The crew members are as follows: loader operator, helper, motorman, triprider, two cutting-machine operators, bug-duster, two drillers and shooters, two timbermen, two trackmen and one cleanup man.

Output per Man High

Average performances in tons per man-shift are as follows, with the first figures cleaned coal and the second total material including the 36% later rejected at the washing plant: wide-work crews, 20 and 31.2; combination wide and narrow crews, 18.6 and 28.9; development crew, 18 and 28; entire payroll, including office, preparation-plant and maintenance departments, 7 and 11.

An average of 520 men were employed underground in the first four months of this year. The surface-crew average was 169.

Under the management plan at Piney Fork, the mine superintendent is not concerned with operation of the preparation plant. His underground supervisory force for three-shift operation consists of the following: one general mine foreman, one assistant general mine foreman, one ventilation and drainage foreman, one safety engineer whose duties include surface safety, two recovery foremen, three shift foremen, 24 section foremen and three dispatchers.

Two recovery crews work in the mine, one consisting of 15 men on the day shift and another of 10 men on the afternoon shift. Their duties are recovery of rails, timbers

and other materials and the delivery of supplies, which coordination is a natural. As a rule a crew is split up into three groups of 3 to 5 men each.

Recovery of the 15-ft steel rails (50-lb and larger) used for systematic crossbar timbering in rooms is 90%. When they are pulled out, the roof caves immediately or within a few hours. Recovery of the wood posts supporting each crossbar (two posts at each end) also is 90%.

Steel Crossbars Recovered

Three men using a locomotive and 100 ft of ¾-in rope recover the steel crossbars by hooking onto the ends and making a quick pull with the locomotive. Pulling too slow may permit time for falls that may cover up the bar. Hooking is facilitated by 2x2-in holes previously cut in the webs of the rails. A 300-ft room usually is pulled in three lifts of 100 ft each. This results in a quantity of material convenient to move to a new location at one time. Two men using a locomotive pull the track rails from the rooms.

Femco trolleyphones were recently installed on the four swing locomotives, the supply-delivery locomotives, mechanics' jeep and the two 21-ton main-line units. As previously noted, the underground main haul is double-tracked. The two-mile outside haul, with a passing track at the halfway point, is fitted with block signals at each end. The two main-line locomotives and 190 mine cars (10-ton capacity) handle, in addition to the underground output, 1,000 tons (cleaned coal) of strip-mine production. The last 30 of the eight-wheeled cars were purchased in 1948. They were made by the Watt Car & Wheel Co. and have Willison automatic couplers.

As the main entry is driven, provision is made in advance for handling any inflow of water that might be expected in the light of the worst experience in the old mine. A 6x10x100-ft sump is constructed every 2,000 ft and a Deming 6-in 800-gpm pump and discharge borehole to the surface are installed. A 6-in pipe is extended along the haulway 1,000 ft each way from the sump. This discharge line stands ready for connecting into it as necessary the discharges from any gathering or intermediate pumps. A thousand feet of 6-in line offers little frictional resistance to normal pumping and will carry a large volume of water in an emergency. The pipe is laid in the main entry as it is being developed and does not lag more than 500 ft behind the face.

Filling the 750-gpm spray tanks that trail the Jeffrey 29 U cutters formerly was a slow job and there was frequent spray-nozzle trouble as a result of dirt. An improved system permits filling a tank on the section in 5 min.

One central underground pumping station with an automatic control taking water from behind a cinder-block filtering wall in a mine-dewatering sump maintains pressure on 7 mi of piping for fire protection as well as for filling the 750-gal tanks. The pump in this automatic station is a Deming 5½x 8-in triplex plunger unit with a Square-D pressure switch to start it when the pressure falls to 20 lb and stop it when the pressure reaches 40 lb. A relief valve set at 60 lb insures that pressure will be maintained on the line even though, for some reason, the automatic equipment fails to stop the unit at 40 lb.

Main pipelines are 3-in; branches, 2-in, with the latter having 2-in take-offs every 200 to 300 ft for filling the water cars. Fire taps are placed not over 1,000 ft apart, which is the footage of hose carried on the fire-protection car. Harry Hill, section foreman, suggested the pressure pump, and Evan Adams, master mechanic, worked out the details.

As the main entry is developed, one air course is scaled, arched and gunited so it will stand for the whole 20 years of mine life. The other air course, however, is posted only, with the idea that it will remain reasonably open for at least a few years. The scaling and guniting is kept to within 600 to 800 ft of the entry face. Two ½-in coats of cement are applied and no reinforcement is used. The Hanna Coal Co. has had many years of experience with gunited headings. Therefore, the Henderson Run guniting is no experiment.

Haulway Graded Near Face

Grading of the two main haulways and installation of the permanent track are kept to within a few hundred feet of the face. Rails are 60- and 80-lb and the ties 4x6-in by 6-ft creosoted, ballasted with a mixture of slag and crushed limestone.

Timbering of the loaded and empty haulways of the main entry consists of 80-lb rail crossbars on 4-ft centers supported on precast concrete-block legs resting on the coal. For 1,500 ft inby the portal, both haulways are lagged between the steel bars with 2-in sawed locust treated with creosote.

The disposal of close to 4,000 tons of refuse from the preparation plant each day is handled by one 15-cu yd Differential electric larry which, with a 15-cu yd trailer car, hauls the material 1 mi up a 4% grade. The dump is built out in a fan shape by dumping from four spur tracks on 6% grades. The trailer dumps from the end and both sides but the larry can dump only from the sides while the trailer is hitched to it. The waste material, crushed to 7 in, is leveled and packed with a bulldozer. Ramps of refuse 80 ft long are built ahead of the ends of the tracks by the bulldozer to minimize difficulties from settling after the tracks have been extended.

Piney Fork and Hanna Personnel

CLEVELAND OFFICE

R. L. Ireland Jr., President
A. A. Jenkins, Vice President in Charge of Sales

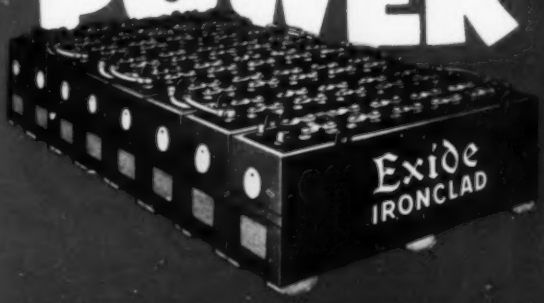
OPERATING OFFICE—
ST. CLAIRSVILLE, OHIO

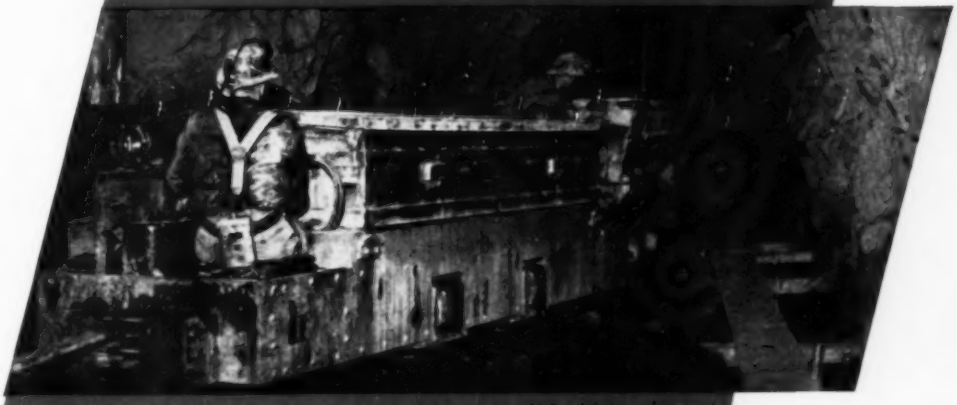
James Hyslop, Executive Vice President
J. D. Reilly, Vice President in Charge Operations
N. C. Prudent, General Manager Deep Mines
R. E. Joslin, Preparation Engineer
W. J. Schuster, Safety Engineer
Andrew Hyslop Jr., Chief Engineer
Jas. G. Ault, Manager of Industrial Relations

PINEY FORK NO. 1 MINE

Walter Bernosky, Underground Superintendent
Henry Ciechomski, Safety Engineer
R. A. Van Dyke, Resident Engineer
Russell Wilmot, Superintendent of Surface and Preparation Plant
Harry Corona, General Outside Foreman
Evan Adams, Master Mechanic
H. A. Patterson, General Mine Foreman
Henry Bikoski, Production Foreman
Albert Bednar, Assistant Mine Foreman, Charge of Ventilation and Drainage
Joe Sabo, Assistant General Mine Foreman
Jake Johns, Mine Foreman, First Shift
John Wasko, Mine Foreman, Second Shift
Pete Boruto, Mine Foreman, Third Shift
Charles Pollack, Recovery Foreman
Okey Howard, Plant Maintenance Foreman

SAFE DEPENDABLE POWER





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EQUIP your battery-powered haulage units with Exide-Ironclad Batteries . . . and keep tonnage moving in maximum volume, at minimum power costs. In mine after mine, in all coal producing areas, these trustworthy batteries are giving daily proof of their ability to keep equipment rolling along in top form, straight through to the end of the shift.

Exide-Ironclad Batteries are DIFFERENT from all others. They have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from mine locomotives, trammers and shuttle cars—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these four Exide-Ironclad characteristics assures years of day-in, day-out service with dependability and economy.

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Ten Steps for Putting A "Plus" Into Training

HAVE YOU EVER WORKED like a beaver showing a new man how to run a machine or lay track or work a bulldozer and then had him disappoint you by failing to turn out the work you expected?

That happens pretty often. You take the man into your section. You describe his job to him. You show him the machine and his tools. You go through all the steps, one by one. Then you watch him while he runs through them, standing by to point out things that will improve his workmanship. For the next several days, you come around often to see how he's doing and answer his questions. You've been patient and courteous and thorough, and by all the rules of the training book he ought to be a good worker. So you settle back and let things rock along for a while.

Then you wake up to the fact that your new machine man isn't getting the tonnage he ought to get, or your new tracklayer isn't laying track fast enough to keep ahead of the machines, or your new 'dozer operator isn't cleaning all the dirt off the top of the coal.

What's wrong? If you've showed him how to do his job, why doesn't he do it well?

It won't do much good for you to threaten and bluster and bawl him out. He might do better for a few days after you jack him up but after that he'd slump down again and you'd be right back where you started.

When a new man doesn't measure up to what you expect of him, the best thing for you to do is to put some "plus" into his training. You haven't done all you ought to do if you stop after you've given him the know-how he needs. That just isn't enough. You've got to find ways to make him want to do his job well. Job training only leads his hands and his mind into the right groove. After that, it's up to you to lead his heart into his work. That's the payoff—when a man works with his hands, his mind and his heart.

How can you put this "plus" into the training you give a new man—or an old hand, for that matter? Here are 10 suggestions:

1. Tell him how important his job is. Tell the loading-machine man how everything — incoming supplies, outgoing mine cars and the output of the preparation plant—is geared to what he does. Show the tracklayer how the motorman and the triprider depend on him. Take the 'dozer operator through the cleaning plant and show him how much harder the tipple men have to work if the coal is dirty. That way, you'll build up each man's opinion of himself and his job. Also, the chances are you'll begin to get some teamwork from your men.

2. Welcome initiative and independence. Give your man a chance to go ahead with his work without feeling that he's got to run to you every time he has a question or some little thing goes wrong. If you insist on being asked or told about everything that goes on, two things will happen: (1) you'll get bogged down in details and thus lose sight of the big targets and (2) your men, being afraid to make decisions on their own, will sit tight and do nothing until you show up, thus delaying operations. So give your worker a little free rein. You may be surprised at the way he can carry on his job without you.

3. Show confidence in your man's ability and judgment. Let him know you believe in him. When he does a job a certain way, different from the way you taught him, leave him alone unless you know his way is dangerous or useless. It may turn out better than you expect and he may be so proud of his way that he'll work harder just to show you that he's right. If his way does turn out all right, congratulate him.

4. Give your man a chance to express the best that's in him by giving him the sort of work he does best. The chances are he'll turn in a better performance if he's doing the work he likes. If your man really likes electricity, for example, try giving him a job as electrician's helper. Since he likes it, he'll work hard at it. The harder he works the more he'll learn. And the more he learns the better man he'll be to have in your section.

5. Show your man the need for doing a first-class job. Suppose your 'dozer operator, for example, doesn't

How Are You on Cutting Cost?

This quiz is designed to help you in your supervisory work. Study the questions and check "Yes" or "No." Then turn to page 106 for explanation.

1.	Do you know what the major items are in coal cost?	Yes ☐	No ☐
2.	Do you know what your machine or machines could produce if they could work at rated capacity all the time?	Yes ☐	No ☐
3.	Do you know the basic principle underlying the design of the continuous mining-and-loading machines?	Yes ☐	No ☐
4.	Have you, in the past three months, looked over the way you do things to see if they could be improved?	Yes ☐	No ☐
5.	Do you have a delay because of a breakdown or lack of cars, supplies, power and so on as often as once a day?	Yes ☐	No ☐
6.	Do you think your men are a pretty good bunch of fellows?	Yes ☐	No ☐
7.	Do you figure your men ought to know their jobs and go ahead and do them?	Yes ☐	No ☐
8.	Has any of your men suggested something to you to speed up the job recently?	Yes ☐	No ☐
9.	Have you suggested anything to your boss recently that you feel would help things along?	Yes ☐	No ☐
10.	Has your crew broken a record lately?	Yes ☐	No ☐

Want better mine lubrication...with fewer lubricants? You're looking at the answer.

Would you like to have *4 or 5* lubricants doing the jobs for which you're now using *10 to 15* specialized lubricants? You *can*. And get a *better* lubrication job while you're doing it! Just join the increasing number of mines that are switching to Marathon multi-purpose lubricants. That's the way to simplify your job...reduce the chance of error...cut down on the number of lubricants you have to account for and handle. Sounds worth-while, doesn't it? Why not write, wire or phone, today...ask for a Marathon Mine Lubrication Engineer to call and work out a complete maintenance program with you?

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scrape off all the dirt off the coal. Tell him that the people who buy and use coal want it to be clean. If it isn't clean, they begin to think about burning oil or gas. When they give up coal and start using oil or gas, the company loses a customer and somebody in the mine loses his job. That's why it's up to every man to do his share to make coal a better product.

Take it another way. A "buggy" operator, for instance, depends on the timberman for a safe roof along the haulageway. Suppose the timberman slacks off and fails to set a crossbar tight. The crossbar slips and a roof fall gets the shuttle-car driver. The worst of it is that a man gets hurt or killed. But that's not the end of it. The newspapers tell their readers about the accident. People then get the idea that the coal industry is backward and careless about safety. Also, the company gets a black eye. With public opinion turned against coal, the industry and the company lose some customers and therefore some miners find themselves out of a job.

So keep showing your man why a top-grade job always is needed. A lot depends on his performance.

6. Give your man a challenge once in a while—something to do that's a little bit harder or more complex than what he's been doing. Most men respond pretty well to a dare of this kind. It gives them a chance to show how expert they are. If your man reacts to your challenge and turns in a good job, he then can say, "I told you so." Saying "I told you so" makes a man feel pretty comfortable and self-confident.

7. Encourage your man. Nearly everybody feels at one time or another that he's just marking time at the end of a dead-end street. To keep your man interested in his work, keep him posted about the outlook for coal and about his own chances of promotion. That doesn't mean you ought to paint rosy pictures all the time just to keep his hope up. It does mean you ought to know the facts about the coal industry and pass them along to your man. To a man who is worth his salt, the facts alone are encouraging enough. You don't have to color them up.

But be careful not to build up false hopes. When you're talking about a future in coal mining, make it clear that things look good for the man who works hard to get ahead and, by study and self-application, keeps himself ready for opportunity when it comes along. Urge him to scout around for a good correspondence course or to take a course run by company, state or federal officials. And then help him along if he has trouble with his studies.

8. Show the rewards of good work. As pointed out earlier, good work and self-improvement pay off. And promotions are not the only rewards. In fact, to a lot of men, promotions and wage increases aren't as important as job security and steady work. Keep showing your man, therefore, that good work means a better product at lower cost. That means happy customers for the company and a steady job with good wages for him.

9. Give your man credit when he improves his workmanship or makes a worthwhile suggestion. That way, you'll build up his self-esteem, give his enthusiasm a boost, earn his respect and win his confidence and cooperation.

10. Set a good example yourself. Be on the job every day, on time. Keep your good humor and control your temper. Try to learn something new every day. And do your work each day as if you expected to move up to the boss' desk tomorrow.

●

Quiz Answer: Cutting Cost

Study of the questions on page 104 shows that they are not solely about equipment and methods. This is because the way men feel about their jobs has a great deal to do with how they produce, meaning that promoting a good working spirit is essential to efficiency. While a number of other questions could have been asked, the answers to these particular ones should be a guide to more results in cutting costs. "Yes" should be the answers to all but Nos. 5 and 7. The reasons, based on generally accepted principles, are:

1. To accomplish the most in cost-cutting, as in any other job, it is necessary to know what the major possibilities are. In bituminous mining, labor is approximately 60% of the mine cost and supplies about 17%. In anthracite, the labor percentage runs higher—around 65%. Therefore, saving labor is the first big road to lower cost; saving supplies the second. Saving labor involves, first, the purchase and installation of machines, and, second, their proper use. The latter is especially the job of the men at the mines.

2. Few machines are operated at anything near capacity in coal mining, partly because necessary moving and other down time makes it impossible. But also, the evidence indicates, too-few operating men know what their machines could do if they could work full time. A check might give you a surprise. Certainly, it would bring into better focus the problem and the opportunity and enable you to go about the job of getting the tonnage up more efficiently.

3. Keeping up with developments means keeping on top of your job production-wise. You may not have one of the new machines around for quite a while, but if you understand what they are meant to do and how they do it you will have broadened your knowledge of the principles of mining and thus will find it easier to get results with the equipment and facilities you do have to work with. Incidentally, the new mining-and-loading machines substitute electric power for explosive energy in digging the coal out of the face, thus eliminating the men and equipment otherwise involved in face preparation.

4. The mining plan, the track layout, the timbering system and all other auxiliary activities have an effect on the productivity of the loading unit. The good supervisor takes nothing for granted and therefore makes it a practice to check his operation regularly to see where improvements can be made.

5. Good service, meaning good track, power, face preparation, ventilation, drainage and so on, is the real key to high tonnage per loading unit and with it high efficiency. Dragging a car 300 ft to change it instead of 150 ft is one example of poor service. Instead of fussing with the loader and its operators, the wise supervisor keeps his eye on the things that go on behind it.

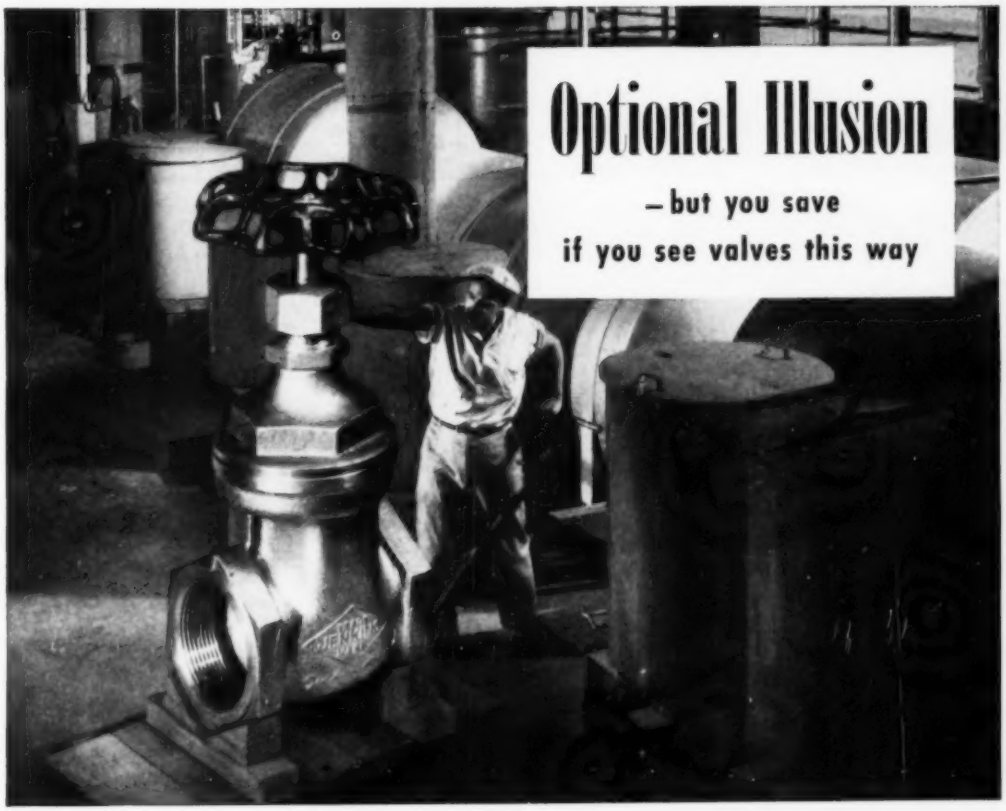
6. If your answer to this question is "Yes," chances are that you are doing a good job of promoting good relations by putting principles into practice. If your opinion of your crew is low, there may be a good reason for it, but also it should be a signal to check up and see if you have failed to take the necessary steps to create good feeling and a spirit of cooperation.

7. The answer to this question involves training—not formal training out of books and in classrooms but instruction and guidance from you designed to develop the maximum capabilities of each of your men and make it possible for them to do their jobs better and more safely.

8. Results are what people and companies pay off on and you as a supervisor are charged with getting results. You have ideas of your own but you should not be afraid to take one from anyone else if it is good. Therefore, you should be encouraging your men to think about what they are doing and how they might do it better, and you should make sure that when they do come up with something they know you appreciate it.

9. Some rules work both ways. Your boss is looking for ideas and in fact expects that you will help him by passing along anything you think will cut cost, promote safety and improve quality. By making sure that he gets your thoughts, you also are helping yourself up the promotion ladder.

10. Perhaps your crew hasn't broken a record lately but if it is consistently down in the list chances are that you are not applying good management principles to the fullest. If so, it is time to check up and get busy. By so doing, you improve your own prospects.



Optional Illusion

– but you save if you see valves this way

THERE ARE TWO WAYS of regarding the valves in your plant. You can think of the relatively small cost of a single valve, and dismiss them as a minor, "petty cash" investment. Or, you can think of *all* valves in your plant as *one* valve, as pictured, by photo-magic, in this pharmaceutical plant. and see them in proper perspective.

YOU'LL FIND IT PAYS to take the latter view, for in *any* plant, *any* building where fluid control is involved, valves, collectively, are as important, in terms of investment and operating expense, as larger plant units, and should be selected with the same sharp eye to quality and economy.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets. JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

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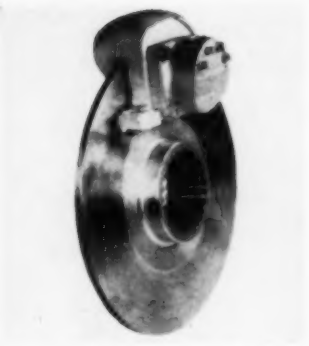


AIRPLANE BRAKE on shuttle car is inspected by Frank Eubanks, Old Ben maintenance engineer (left). The brake itself is shown at the right.

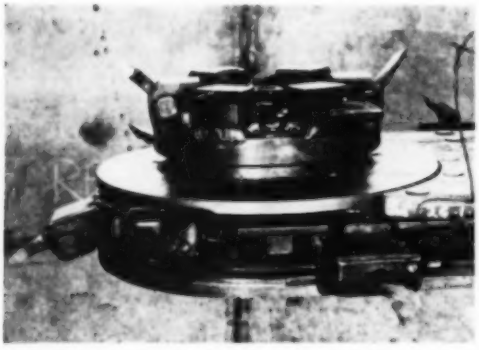
Airplane Brakes Boost Shuttle-Car Efficiency

A SUBSTANTIAL INCREASE in shuttle-car operating time, with a corresponding reduction in maintenance cost, is reported as a result of year's test of an airplane-type single-disk brake at No. 9 mine of the Old Ben Coal Corp., West Frankfort, Ill. The brake, of the non-self-energizing type, was developed by Goodyear from airplane equipment and was first installed on a No. 9 shuttle car in May, 1948, in cooperation with the Joy Mfg. Co. (*Coal Age*, p 86, April).

No brake failures were encountered in hauling 96,131.71 tons in the test car in less than a year's time, reports Frank Eubanks, Old Ben maintenance engineer. Experience with the original installation led to a program of equipping all shuttle cars and, Mr. Eubanks comments, "Down time because of brake failure on our shuttle equipment has been decreased by more than 80% and production has been increased materially as a result."

The new brake, it is stated, provides a soft-cushion braking effect in contrast to the quick-grabbing action of conventional types. It also eliminated, on the Old Ben cars, the necessity for motor plugging. The brake also is described as having a straight-line torque curve throughout the braking range and provides equal torque in both directions. It is simply constructed, easy to reline and is self-adjusting over the life of the lining. The self-adjusting feature, it is stated, enables operators to enjoy a fixed pedal stroke at all times.

Use of the brake, it is reported, is being extended to many other types of mining equipment, in addition to shuttle cars already in service.



ROTARY SLOTTING HEAD converts cutter bar into mining unit.

Milling Head Converts Cutter to Miner

MINING BY CUTTING with a special cutter bar equipped with an auxiliary cutting-off or milling head is contemplated under a patent held by the Sterling Iron & Steel Co., Ltd., of Australia. Developed by J. B. Robinson, master mechanic, Australian Iron & Steel Co., Ltd., the business end of an early design of bar is shown in the accompanying illustration. Bar length is 9 ft. Mining is done by slicing the face up into sections about 14 in thick by means of horizontal cuts, starting at the bottom and working up, turning the bar over for the top cuts. The milling head cuts a slot at the back of each slice, weakening the connection with the solid coal sufficiently to permit the slice to fall of its own weight. Mr. Robinson also was planning a double-head bar with milling heads both top and bottom.

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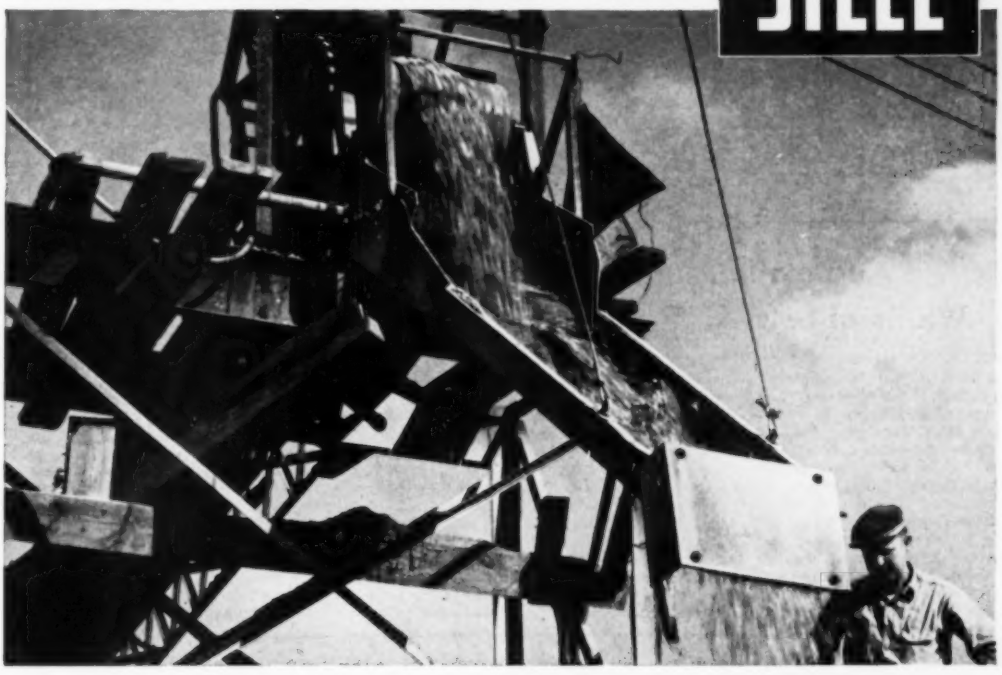

Money is saved when J&L Jalloy replaces mild steel on chute bottoms and baffle plates

Mild steel baffle plates on the gravel-loading chutes were replaced every three or four days. Now Jalloy baffle plates last *six to seven weeks ten times as long!*

Mild steel chute bottoms lasted an average of three weeks. Jalloy plates in the same application now last an average of *four months five times as long!*

This is the record of J&L heat-treated Jalloy steel plate at Massaponax Sand & Gravel Co., Fredricksburg, Virginia. As a result of this record on their first order of Jalloy from William G. Wetherall, Inc., Baltimore, Md., Massaponax now uses Jalloy exclusively for chute liners.

J&L Jalloy is a manganese-moly alloy steel heat-treated to resist abrasion and impact. It is a *modern* steel for products such as: chutes, conveyors, heavy-duty truck bodies, power-shovel buckets, dump cars, bulldozers, scrapers, rock crushers—products that must resist wear.

Heat-treated Jalloy is available in bar and plate form with widths up to 72 inches, lengths up to 20 feet, and thicknesses from 3/16 inch to 2½ inches.

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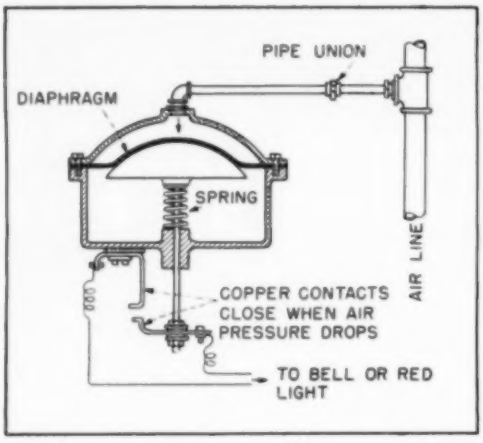
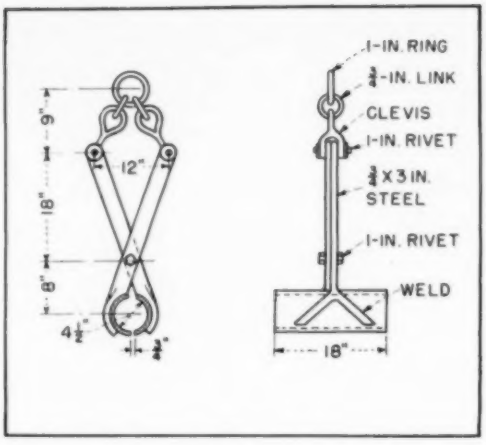


Automatic Alarm Warns of Low Air Pressure

BECAUSE the failure or drop in air pressure may cause trouble at various points both underground and on the surface, it is important that those in charge of the compressed-air supply be notified immediately when either condition develops. Major parts of the alarm shown above, reproduced from *Engineering & Mining Journal*, include a small circular iron chamber with bell-shaped top, a rubber diaphragm, piston, spring and two copper contacts. The device reacts quickly and positively. As long as normal pressure prevails in the supply line, the piston remains depressed and the contacts are open. However, any drop in air pressure will immediately raise the piston, which closes the two copper contacts attached to the piston rod and operates the alarm circuit which can be connected to any type of alarm desired.



Tongs Lift Car and Locomotive Axles Safely

CHAINS, HOOKS OR SLINGS may not always be desirable for lifting car and locomotive axles in mine shops because of the danger of slippage or unbalancing while parts are being moved. With the tongs shown above, designed to handle axles of various diameters, such difficulties can be overcome, according to *Engineering & Mining Journal*. The jaws are made long enough so that an axle will remain balanced even if the axle is slightly less in diameter than the maximum for which the tongs have been designed. Because of the $\frac{5}{8}$-in clearance at the bottom of the jaws, the tongs can be placed several inches out of balance and still maintain equilibrium. Slippage is prevented by the large leverage ratio provided. Each arm of the tongs has a swivel clevis at the top which are connected to a ring through links.

Gate Operated by Antenna on Tractor

ANTENNA EQUIPMENT on tractor permits control of the hopper gate by the operator without leaving his seat.

WHEN THE ANTENNA on the rear of the tractor shown with accompanying scraper in the illustration herewith contacts overhead electrodes, the tractor operator is in position to control the opening and closing of the gate on a coal hopper in the Ohio yards of the Cincinnati Gas & Light Co. After a light in the cab of the Allis-Chalmers HD-19 machine indicates that contact has been made with the electrodes, controls in the cab permit the driver to work the gate without leaving his seat. Average loading time with the scraper used has been cut to 10 to 12 sec, it is reported.

Your "Kinks" Also Welcomed

WHY NOT MAKE IT A POINT to send us today the operating, mechanical, electrical or safety "kinks" you have successfully put to work. COAL AGE will gladly publish your worthwhile ideas and other mining men will thank you for the help. Also COAL AGE will pay you $5 or more for each, on publication. So don't delay—write today!

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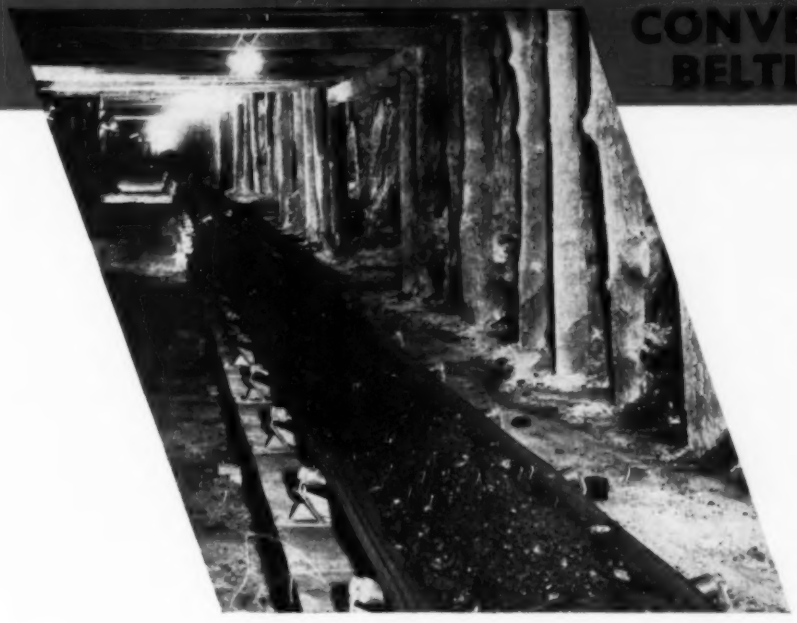

● KING KOAL belts have the ability to meet the varying requirements of entry, gathering, mainline, slope and preparation of plant installations.

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PINNING MACHINE is marked by good visibility, easy maneuverability, and low cost.

HIGHWALL DRILL, also made from Army half-track, has rubber cleats on track to avoid damage to the coal.

Half-Tracks Made Into Bank Drill and Pinning Machine

TWO ARMY SURPLUS HALF-TRACKS, bought at low cost from the War Assets Administration, have been converted into a bank drill and a pinning machine at the New Castle mine, Windsor Coal Co., Windsor, Mo. Designed by Fred Bowen, superintendent, and built in the local shop, the drill and pinning machine recently have been put to work in the pit.

The pinning machine, shown in one of the accompanying photographs, has a 14-ft tower which is hinged about 5 ft above the truck bed, enabling the machine to pass under overhead cables and beneath the stick and boom of the loading shovel. A White 140-hp gasoline engine provides power to drive the half-track and to lift the 4,200-lb weight. Lifting power is taken off the front end of the engine crankshaft and a Ford differential governs lifting speed. A wedge-shaped pin, 20 in long and tapered from base to tip, is fixed to the underside of the weight for breaking the coal, which lies in a thin seam. A special Timken axle at the rear supports the weight.

Advantages cited for the pinning machine are: its low cost, total investment being about $2,000, according to Mr. Bowen; good visibility, enabling the operator to watch the height to which the weight is lifted and thus to govern the impact when it is dropped; speed and maneuverability, inherent in the half-track and enhanced by the hinged tower; minimum damage to the coal because of rubber cleats on the tracks and front wheels; and long life for lifting cables as compared with frequent breaks in conventional chain lifts.

The bank drill, also shown in one of the accompanying photographs, requires no supporting jacks. Like the pinning machine, power is taken off the half-track engine.

Safety Hints for Shop and Maintenance Men

1. It is easier as well as safer to work on a job that is kept clean and orderly.

2. Leave no projecting nails, or other parts that anyone may step on or strike against.

3. Use only ladders you know are safe.

4. Sharp cutting tools are safer to work with than dull ones. Avoid tools with defective handles or mushroomed heads.

5. Do not carry sharp edged tools in your pockets unless the edges are protected.

6. When working overhead make sure that tools and materials cannot fall onto persons below.

7. Use all the guards provided for any machine.

8. Stand out of line of wood being fed into saws, jointers, planers, etc., to avoid a possible kick-back.

9. When building a scaffold, even though it is to be temporary, do a safe job, with plenty of nails and strong bracing.

Files

1. See that there is a securely fitting, substantial handle on each file you use.

2. If any files have particularly sharp pointed tines, round them off to avoid snagging your hand when reaching into the kit box.

3. Never hit a file with a hammer; pieces of the hardened steel are likely to fly.

4. Do not make a center punch or a chisel out of an old file; the metal is too brittle for this purpose.

5. A file breaks easily if you try to use it as a pry, and pieces may fly.

6. It is hazardous to carry a file in your pocket without a handle over the tine; if you should fall the tine might be driven into your body.

7. The cleaner and sharper you keep a file, the less chance there will be for it to slip and result in a skinned knuckle or other wound.

Pipe Wrenches

1. Use only wrenches in good condition and the right wrench for the job—never a substitute.

2. Never use an extension on a wrench.

3. Always face an adjustable wrench forward, in the way the handle is to turn.

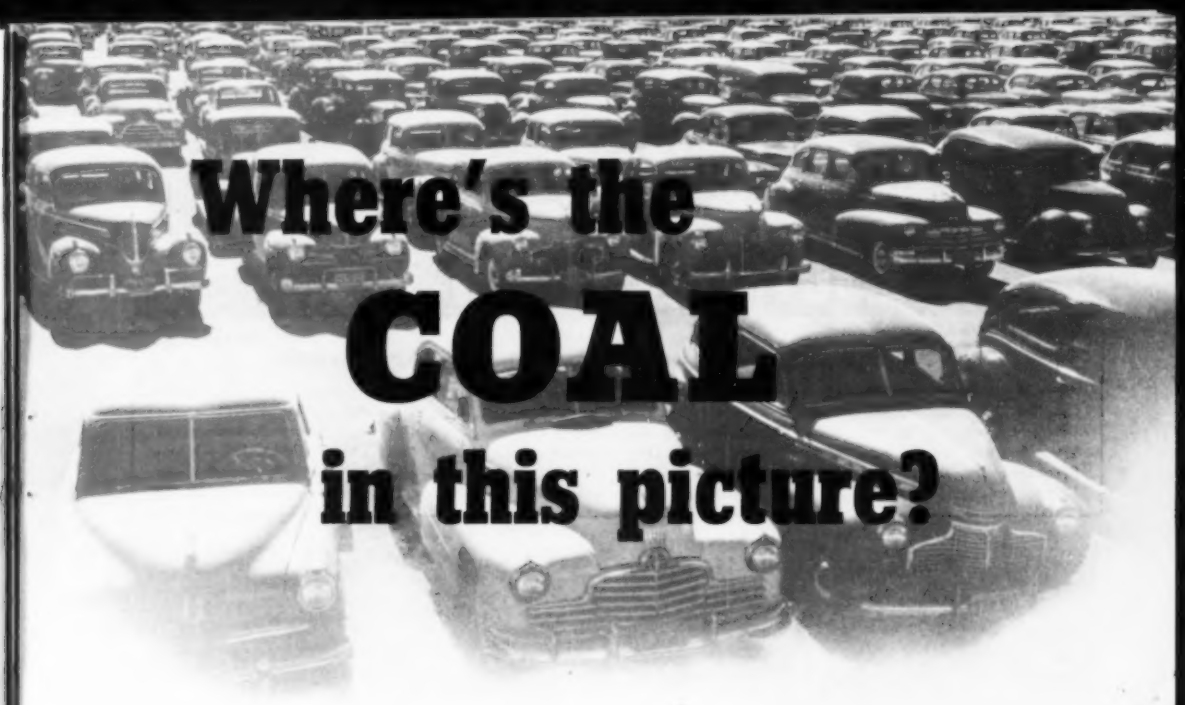
4. See that the bite is taken near the middle of the jaws. Keep the teeth sharp.

5. Do not subject wrench to side strain or use wrench as a hammer.

6. Do not use wrench on machine in motion.

7. Keep in clear in case wrench does slip.

—*Safety News*, West Virginia Coal & Coke Corp.



Where's the COAL in this picture?

Just about everywhere you look

It's in the gleaming baked-on finish, in the electricity that chrome-plated the shining trim. Coal's in the nylon cords in the tires, in the plastic upholstery, in the insulation on the wires. Coal powered the welding arcs that knitted the chassis together, and the tremendous machines that forged, bored and mirror-finished the motor and gears.

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Of course, it will take more than run-of-the-mill equipment to make the necessary efficiency short-cuts possible. **A.C.F.** *Drop Bottom* Mine Cars, for instance, that can dump coal at the rate of a ton-a-second, without even stopping. Imagine—a whole 16-car string dumped and ready to head back to the slope in one minute and twenty seconds! Less unproductive loader time... more efficient mining!

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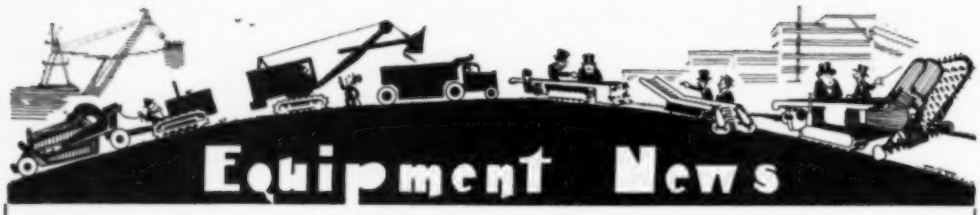

Equipment News

New Equipment for Better Mining and Preparation

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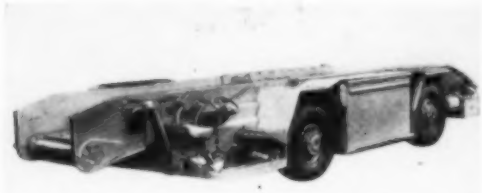

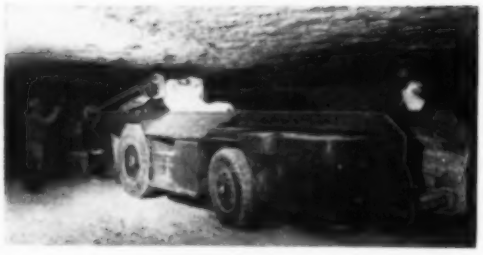

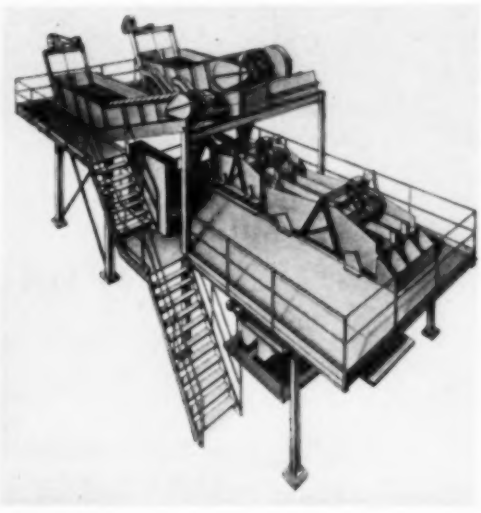

Two New Shuttle Cars Designed For Full-Shift Power Performance

NEW IMPROVED Joy permissible battery-type 5-SC-6PD shuttle car (top photo) features a built-in connector permitting the operator to plug into a booster circuit at the unloading station to secure power for unloading the car and recharging the batteries at the same time. The consequent reduction in drain on the batteries permits hydraulic steering and hydraulically-adjustable elevating discharge, with batteries maintaining the required power throughout the shift, according to the manufacturer. The car is 42 in high; 23 ft long; 87 in wide; has a ground clearance of 7½ in and a capacity without sideboards of 145 cu. ft. New 60-E-11 unit (lower photo) powered by single diesel-generator set especially engineered for shuttle-car use features complete operating flexibility, with a fuel capacity sufficient for rated power throughout a full shift, and can operate on steeper grades than either battery or cable-reel units, Joy reports. The car is 60 in high; 24 ft long; 7 ft 10 in wide; and has a ground clearance of 11½ in. Its load limit is 14 tons. Capacity is 285 cu ft and with 6-in sideboards, 330 cu ft.—*Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.*

Prefabricated Heavy-Media Plant Features One-Man Operation

NEW SWECO factory-built Heavy-Media-separation plants available in 100-tph and smaller sizes feature simplified field erection, one-man operation and maintenance, low initial cost, mobility and low power requirements. The Akins separator used in the unit is capable of producing a middling product in one operation and in a single cleaning circuit, handles all normal sizes, requires no airlift and need not be unloaded when the plant is stopped, according to the manufacturer. Other equipment incorporated in the plant include an Akins densifier, Wilfrey pumps and Dings magnetic separator, with the design permitting use of either Allis-Chalmers, Robins or Simplicity flat, single- or double-deck screen. Standard rolled structural members provide a more rigid structure and help reduce steel requirements, it is said. Steel hoppers, launders and piping are prefabricated and field assembly of the entire unit is speeded by the templates provided. Central and interlocking controls help prevent spillage and overloading and permit one-man operation. Bulletin 902 available.—*Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 11, Calif.*

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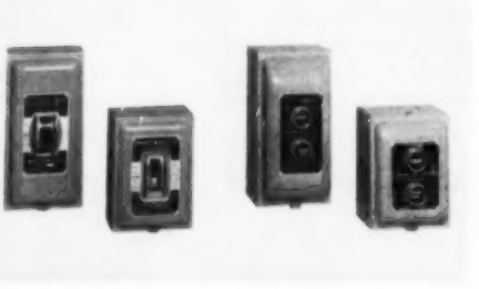
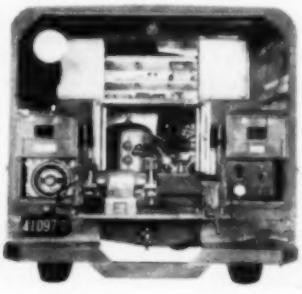
CONVEYOR-BELT PNEUMATIC IDLER—New impacts-cushioning idler developed by Goodyear uses airplane tires and is said to absorb several times the shock possible with the former industrial-tire type and permit conveyor-belt users more latitude in the size of bulk material handled. The 36-in unit consists of six 6.00:6 tires mounted on a simply constructed stand, with the entire unit on one axis rather than offset. The cushioning idler reportedly was developed as a service to the industry and conveyor belt users but will not be manufactured by Goodyear.—*Goodyear Tire & Rubber Co., Akron, Ohio.*

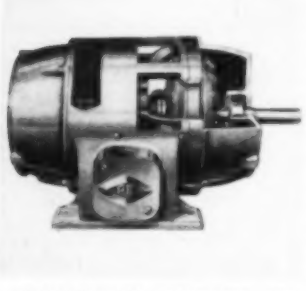
IMPROVED TRUCK ENGINEERING—This Ford F-8 21,500-lb-gvw tractor with tandem-rear-axle semi-trailer is typical of the improved models achieved through constant engineering changes in the past 18 months since introduction of the series, Ford reports. Features recently added to the unit include availability of air brakes, a 178-in-wheelbase model and a single-speed rear axle, new-type exhaust valves, improved styling and driver comfort. Various improvements are reported for other models, which range from 4,700 to 21,500-lb gvw, with wheelbases to 195 in.—*Ford Motor Co., Dearborn, Mich.*



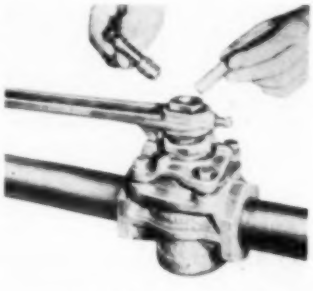
AC MOTOR STARTERS—New line of manually operated GE starters for ac motors up to 7½ hp are available in both toggle and pushbutton types in 2-, 3- and 4-pole forms, Sizes 0 and 1, as shown above. The toggle-operated units also are available with cast-iron enclosures for wet, dust-laden or hazardous locations. Features cited by the manufacturer include bimetallic overload protection providing extremely accurate response; a wide range of heaters; and positive indication of overload trip by neutral position of toggle or pushbutton. Bulletin GEA-1522-F.—*General Electric Co., Schenectady 5, N. Y.*



MOBILE SERVICE TRUCK—Type PW-308 field service unit, mounted on a 4-wheel-drive truck and especially designed for servicing of equipment on the job, has space for driver and six passengers. Equipment carried includes 300-amp welder and 8-kw ac generator driven by the truck engine through a Davey power take-off; high-pressure lubrication equipment powered by a Davey compressor; oxyacetylene welding, cutting and brazing unit; 8-in electric-powered bench grinder; portable arbor press; floodlights; 7,500-lb winch; and various other tools. Bulletin E-232 available.—*Davey Compressor Co., Kent, Ohio.*



FLUID-DRIVE ELECTRIC MOTORS—New Fluid-Shaft motors featuring a single-frame, integral design of electric motor and fluid-drive coupling are said by the manufacturer to offer savings in both original and operating costs and in mounting area. Advantages cited include smooth accelebration of difficult loads, with consequent use of motor closer to actual requirements; power savings from reductions in starting current; and absorption of shocks in an oil cushion. The units are available in various ratings up to 10 hp in standard foot-mounted or round-body frames and in combination with either single- or double-reduction motor reducers. Fluid-Shaft units utilize regular Reuland Electric motor frames and end bells, thus eliminating special expensive parts. Bulletin RU-4.—*Reuland Electric Co., Alhambra, Calif.*



PRESSURIZED PLUG VALVES LUBRICATED AUTOMATICALLY—New Hypermatic lubricant devel-

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Ask any user . . . you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® *Preformed*. It lasts longer — is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant — Palmer, Mass.

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ON THE WEST COAST — The California Wire Cloth Corp.
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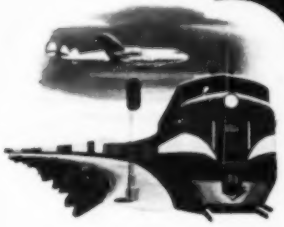
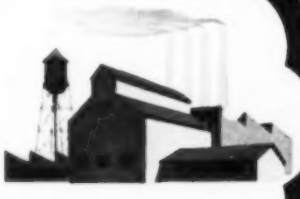
LOGGING



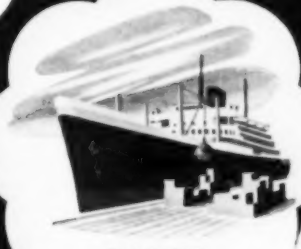
TRANSPORTATION

MINING

PETROLEUM



MANUFACTURING

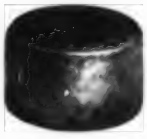


MARINE

CONSTRUCTION

Toothed Lock Washer: Prevents loss of stem nut due to vibration, thereby holding the handwheel securely.

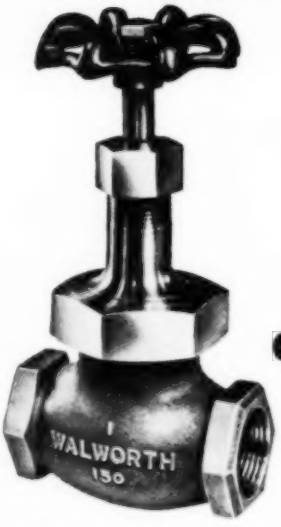
Newly Designed Handwheel: Air-cooled, finger grip handwheel affords sure grip even with greasy gloves.



Improved Packing: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure.

Hexagonal Union Bonnet Connection: Eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and assembled.

WALWORTH



IMPROVED
No. 95
BRONZE
GLOBE VALVE

also available in Angle Type (No. 96)

The service ratings of the Walworth No. 95 are 150 pounds per square inch steam at 500F, and 300 pounds per square inch non-shock cold water, oil, and gas. In the manufacture of this quality bronze valve, more than 47 gages are used in machining parts to micrometric accuracy, thus insuring interchangeability of parts. For further information see your local Walworth distributor, or write: Walworth Company, 60 East 42nd St., New York 17, N. Y.

note these 7 Great Features

WALWORTH
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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

New Cylindrical Disc Holder: The design of the top portion of the disc holder keeps the disc accurately guided under all operating conditions.

Renewable Asbestos Disc: This disc is suitable for steam up to 500F and is resistant to oil, gasoline, and many chemicals at atmospheric temperatures. Discs for special services are available.

Extra Strong Body: Made of Composition M (ASTM B61) bronze thick enough to provide a high safety factor. Valves undergo hydrostatic shell test of 450 psi.

for continued operation at 75 C

...make sure it's Geoprene Portable Cable

Now you can cut cable size, stop hauling bulky 60 C cables. Tough General Electric Geoprene cables—rated in accordance with ASTM Specification D754-43T for 75 C operation—let you use lighter, smaller cables than ordinary rubber permits.

On many machines General Electric Geoprene-jacketed cables can produce substantial savings in cable size. Shovels, for example, that used to require a 4/0 Awg conductor, now need only a 2/0 Awg conductor in a Geoprene cable.

In addition to smaller size, Geoprene cables give you added toughness. With two and a half times the tear resistance of natural rubber, Geoprene can take the tough jobs in stride—make sizable savings in spots where replacements are normally high. Easy handling, flexible Geoprene cables are superior to rubber, too, in resistance to heat, sunlight, oils, alkalies, acid, and flame.

Why not get the whole story on what General Electric Geoprene cables can do for you? Call in your General Electric cable specialist, or write for the free bulletin, *Geoprene Portable Cable*. Address Section W57-1014, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

G-E Geoprene-jacketed Portable Cables

GENERAL ELECTRIC

THE NEW DU PONT "DETECT-A-METER"

A Single Instrument With 2 Uses

1. A stray current detector 2. A blasting galvanometer

Stray currents have always been a source of danger near blasting circuits. The present increasing use of electric blasting and large electrical equipment increases the danger of stray currents leaking into the blasting system.

The Du Pont "Detect-a-Meter" is the first practical instrument devised for stray current detection. It has two scales: 1—low-range from 0 to 2.5 volts, allowing detection of voltage as low as 0.1 volt, and 2—high-range from 0 to 25 volts. Works equally well on either AC or DC. By finding stray currents before hooking up, you can take steps to eliminate these dangerous conditions.

The "Detect-a-Meter" also performs all the functions of the well-known Du Pont Blasting Galvanometer for checking blasting caps and firing circuits before connecting up. Complete instructions supplied with each instrument.

Today—take an important step toward greater safety in blasting operations by obtaining complete information about the new Du Pont "Detect-a-Meter." It's an inexpensive investment in accident prevention. See your Du Pont Explosives representative, or write E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

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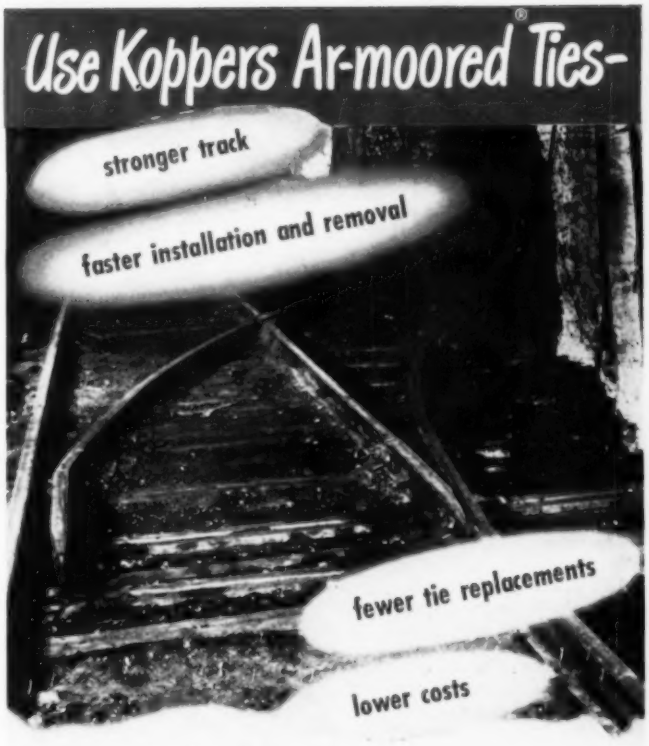
The new "Detect-a-Meter" is provided with durable genuine leather case with shoulder straps. Actual size of meter —1¾ x 3¼ x 4⅝ inches.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

oped for use on Nordstrom pressurized plug valves is easily inserted in stick form into the shank of the plug to provide automatic self-feeding lubrication without forced-feeding devices. Because the compound is highly compressible and expansible, a large quantity may be inserted and, with adjustment of the lubricant screw, expands as needed through the channels. Hypermatic is said to be volumetrically flexible, self-sealing and self-acting, and to be presently applicable on temperature lines ranging from sub-zero to at least 250 deg F. Bulletin available.—*Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh, 8, Pa.*

PLATE MAGNETS—Newly redesigned line of Eriez permanent nonelectric Standard and Jumbo plate magnets offers a 50% increase in magnetic strength and a 30% decrease in weight over previous units at no increase in cost, according to the manufacturer. The new units reportedly achieve the greater magnetic power through efficient design, newly developed Alnico material and new charging technics. They are available with or without hinges in standard sizes ranging from 4 to 72 in wide, with special sizes and shapes also available.—*Eriez Mfg. Co., 1045 East 12th St., Erie, Pa.*

DIESEL LOCOMOTIVE CRANE—Model 410 designed especially for high speed work and lighter jobs where a larger unit would be uneconomical features minimum weight, moderate first cost and many operating advantages of larger units, according to the manufacturer. Powered by an electric-starting diesel en-



WHEN you want a sound, stable track that maintains gage under heavy mine traffic, and that can be lifted and relaid frequently without the need for numerous tie replacements, install Koppers Ar-moored Ties.

Koppers Ar-moored Ties have preformed, pre-bored, chemically-treated oak bases to which steel mine ties are secured. The pressure-treated base has high resistance to decay, and it may be ballasted easily to prevent shifting. The steel tie protects the wood from splintering and tearing, and its stationary clips establish and maintain track gage without the use of gage rods.

One user reported that he relaid his Ar-moored Ties *over 50 times* and then he "quit keeping count" because the end of their usefulness was nowhere in sight. The experience of another typical mine indicates an annual cut of 45% in tie costs after 2000 Koppers Ar-moored Ties were installed in the mine.

Use the coupon below to obtain a free copy of Koppers new illustrated book, *10 Proven Ways to Cut Mining Costs.* It's interesting and informative. It contains practical, helpful information about the money-saving advantages of Koppers Ar-moored Ties and Pressure-Treated Lumber.

KOPPERS COMPANY, INC., Pittsburgh 19, Pa.

KOPPERS PRESSURE-TREATED WOOD

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Victaulic Couplings, Victaulic Full-Flow Elbows, Tees and other Fittings are designed for quick assembling and leak-tight dependability. Simple two-bolt connection for quick, easy hook-ups . . . a standard T-Wrench is the only tool needed! It's Victaulic for up-to-the-minute modern engineering and construction . . . Long-lasting, leak-proof joints assured . . . built for rugged usage . . . made to stand up under toughest pressure, vacuum, or strain!

"*Vic-Groover*" makes grooving those pipe ends easy . . . grooves 'em *automatically* in *half the time* of a conventional pipe threader!

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gine developing 72 hp at 1,600 rpm, Model 410 has a rated capacity of 10 tons with a 40-ft boom at 12-ft radius and three travel speeds up to 15 mph. Bulletin 600 L-7 available.—*American Hoist & Derrick Co., St. Paul 1, Minn.*

AIR-BREAK CONTACTOR—New Type 256 high-voltage air-break contactor, measuring 15 in wide, 25 in deep and 38 in high, has double break contacts that halve the arc voltage and double the rate of dielectric recovery, which, together with a vertical direct-action solenoid-type magnet, eliminate the need for flexible leads, turning shaft and shaft bearings. The unit is available with mechanical and electrical interlocks for reversing or dynamic breaking service. The present AC line of high-voltage motor starters equipped with oil-immersed contactors has been augmented with units incorporating the new Type 256 air-break contactors.—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.*

MAGNETIC SEPARATOR—Permanent drum-type non-electric Alnica magnetic separator, complete with shaft and V-belt drive sheave for automatic tramp-iron removal, can be installed at the discharge end of chutes, spouts and conveyors. No discharge aids are necessary, the manufacturer states, and there is no drum-shell wear from adhering tramp iron. Type FA and SA units also are available with the Perma-Drum fully enclosed. Housing is of all-metal dust-tight welded construction, equipped with completely enclosed electric motor and speed reducer drive, and top and bottom flanges for quick installation in chutes and ducting. The type SA separator has a separate discharge spout for tramp iron.—*Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee, Wis.*

WELDERS—New Wilson 36A "Yellow Jacket" heavy-duty arc welder is built in 300- and 400-amp sizes. The "Yellow Jacket" is a dc 40-volt NEMA-approved variable-voltage generator. It features, according to the company, simplified control of current output by means of a sturdy hand-wheel-mounted on the control cabinet. Close calibration of the current dial eliminates the need for meters. For instant recovery voltage over short circuit, the generator is self-excited with excitation of the main field obtained through an auxiliary brush. The unit is belt driven by a six-cylinder industrial engine and is available in stationary or portable models. It is 76 in long, 28 in wide and 49 in high. Optional equipment includes either a two- or four-wheeled high-speed spring-mounted trailer equipped with pneumatic tires for use with the portable model.

Air Reduction, also offers a new ac-transformer arc-welding machine, known as the Wilson 200 Ampere Max. MCT. According to the manufacturer, the unit is an economical por-

These Vital Parts fit *ALL* GM "71" DIESELS

Every GM Series 71 Diesel engine, whether a two-cylinder or one of a Quad 6, *has the same bore and stroke.* This means that practically all moving parts are exactly the same for any size Series 71 engine from 43 to 520 continuous B.H.P.

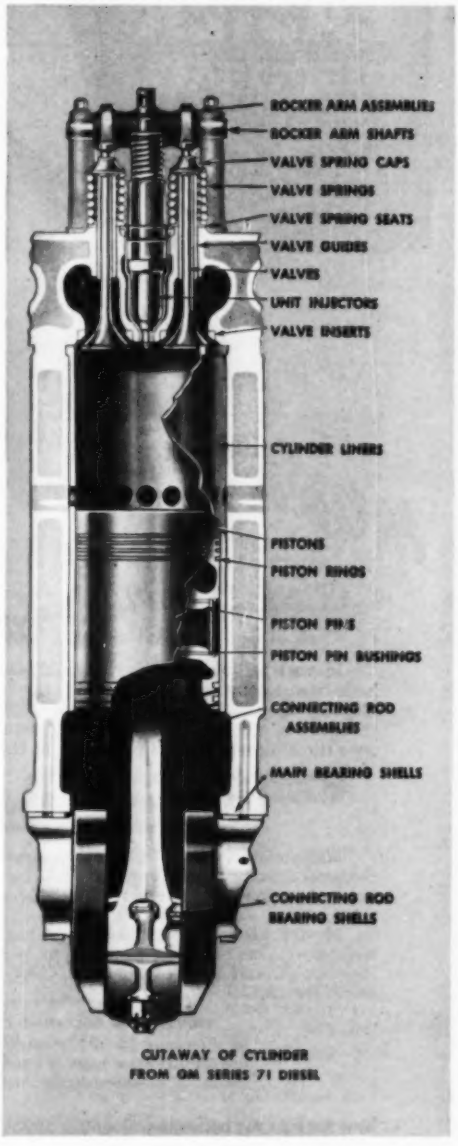
For example, all of the GM Diesel parts shown here, plus dozens more, are completely interchangeable, regardless of the number of cylinders, horsepower, age or usage of the engine.

To large contractors, oil drillers, truck or boat fleet operators, this unique feature of GM Diesel design means lower parts inventories and less time out for maintenance.

To the individual owner, it brings a no less important benefit. A *single* inventory of basic parts on the distributor's shelves increases the availability to owners of the *right* part when it is needed.

Maximum parts interchangeability is just one of the many *plus* values that go with your purchase of General Motors Diesel engines—a good reason why it pays to *standardize* on GM Series 71 Diesels.

For topmost satisfaction and reliability, always buy genuine "Factory-Engineered" GM Diesel parts from your authorized distributor or dealer.



CUTAWAY OF CYLINDER FROM GM SERIES 71 DIESEL

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SINGLE ENGINES... Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

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DIESEL BRAWN WITHOUT THE BULK

EASIER DISPOSAL of silt, coal refuse!

MORRIS TYPE R SLURRY PUMP

Saves you the high cost of trucking refuse away!

In coal washeries and processing plants, Morris Pumps have been saving coal operators thousands of dollars in waste disposal operations. They eliminate expensive truck maintenance . . . trucking labor . . . and in many cases, they eliminate the building of roads for trucks to travel.

Morris pumping installation is simple in design . . . low in cost

Morris furnishes pumps of various types depending upon the operating conditions . . . type of refuse to be handled . . . static discharge head . . . length of pipe line through which refuse is discharged.

Morris also recommends the size of piping best suited for the job. Pipe laying expense can be kept at a minimum by using light weight abrasion resisting pipe, easily and quickly coupled . . . easily moved . . . suitable for uneven terrain.

REDUCE YOUR OPERATING COSTS—NOW!

Morris Pumps are ideally suited to the removal of fine silt and other types of refuse. They're easy to install . . . easy to maintain . . . easy to dismantle.

Write today for full information. Read how Morris' wide experience of 83 years in building and installing pumps and dredges can save you money and refuse disposal headaches. We'll also send you names of mines now using Morris installations.

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MORRIS *Centrifugal Pumps*

table welder specifically designed for small shops, garages and maintenance crews. It has a rated maximum output of 200 amp and is completely self-contained.—*Air Reduction Sales Co., 60 E. 42d St., New York 17.*

COUPLINGS—New line of Series DSC stock silent-chain flexible couplings feature, according to the company, sturdy all-steel construction for maximum power transmission capacity with minimum space requirements. Two sprockets wrapped with center-guide Morse silent chain assure easy installation and quick disconnection by unwrapping the chain after removing the single connecting pin, or by moving either sprocket endwise out of mesh. Stock bores range from ½ to 2⅞ in. with capacities up to 119 hp at 2,000 rpm.

A new single-connecting pin design features the Series DRC stock double-roller chain couplings of the same company. The single connecting pin design increases the ease with which roller chain couplings can be assembled or disassembled, it is stated. More DRC roller-chain couplings are made in seven sizes ranging from 2.7 to 97 hp per 100 rpm and are carried in stock with a wide range of finished bores. Catalog C45-49 covers both types.—*Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.*

DIESEL ENGINES—New Cummins supercharged high-speed NHRS-600 diesel engine develops 300 hp at 2,100 rpm. The NHRS-600 is patterned after the proved design of the NHS-600, and continues the company policy of developing diesel engines with lower weight per horsepower. Features include: a rated output of 300 hp at 2,100 rpm; a reduction in fuel consumption in the high horsepower-output operating range; completely new fuel pump 56% smaller and 65% lighter; fully counterbalanced crankshaft, improved piston design, improved tubular-type lubricating oil cooler, and same size and installation dimensions as the Cummins NHS-600 engines except for the smaller fuel pump and new oil cooler.

New four-cylinder diesel also offered by Cummins has a maximum rated horsepower of 110 at 1,800 rpm. The addition of this new high-speed engine—the HR-400—extends the Cummins diesel line to 72 models for all types of automotive, industrial and marine applications requiring from 50 to 550 hp. The new HR-400 is stated to be light in weight and compact in size. Mounting dimensions for the basic industrial model are 43 7/32x29 ⅜x47⅜ in. Bore is 1⅝ in; stroke, 6 in; piston displacement, 495 cu in. Like all Cummins diesels, the HR-400 is a four-cycle engine, and uses the exclusive Cummins fuel system. It is equipped with standard two-valve heads; a new increased-flow lubricating system; continuous groove main bearings and standard HR liners and head gaskets. It is available in an automotive model, HRB-400; five in-

TO STACK SPOIL HIGH AND FAR, USE

MARION *WALKING DRAGLINES . . .*

MARION Walking Draglines have solved some of the most difficult stripping problems, including the fast, easy handling of deep overburden that must be stacked high and far away.

MARION Walkers can travel and work almost anywhere . . . open their own paths, travel over semi-marshy ground, or perch on the edge of a rocky cliff. They get you in . . . and out . . . of tight places.

In anthracite, they strip away as much as 110 feet of rock . . . and then recover the coal from the bottom of the cut.

Some MARION 7200's are rehandling the spoil of big shovels . . . and keeping pace with the shovel.

Dozens of MARION Walkers are in daily use . . . let us analyze your operation and take you to a comparable problem where MARION Walkers are on the job. You'll see why the story of MARION Walkers is one of outstanding accomplishment and proven dependability. Contact your nearest MARION representative, or write to our general offices for literature.

BIG LOADS—5 to 30 cubic yards.
STACK IT HIGH—Dumping height from 30 to 86 feet.
. . . **AND FAR AWAY**—Boom lengths 100 to 260 feet . . . dumping radius to 260 feet (a skillful operator can throw loads up to 65 feet farther).
THREE SIZES—MARION 7200, 5 to 7 cubic yards, diesel or electric power; MARION 7400, 10 to 12 cubic yards, diesel or electric power; MARION 7800, 18 to 30 cubic yards, electric power.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

These wood preservatives
1. REPEL TERMITES
2. RESIST DECAY
3. RETARD FIRE
and leave wood clean, paintable and safe to handle!

NEW DU PONT COPPERIZED CZC

(CHROMATED ZINC CHLORIDE)

To give wood *extra-long* protection against termites and decay, specify pressure treatment with Du Pont Copperized CZC. In addition, this new salt-type preservative gives timber and lumber all the time-tested advantages of standard CZC treatment. The effectiveness of Du Pont Copperized CZC is shown by these six significant tests: leach block test, hardware corrosion test, accelerated service test, pilot plant treatments, strength tests and glow tests.

STANDARD DU PONT CZC

(CHROMATED ZINC CHLORIDE)

A favorite for many years, Du Pont CZC is a *more economical* preservative treatment to specify when protection against fire is your main objective. It also gives timber and lumber good protection against termites and decay . . . leaves wood clean, easy to paint and safe to handle.

Which of these outstanding wood preservatives to specify depends on your particular needs. Each gives timber and lumber long-lasting, dependable protection. We suggest you consult your nearest wood preserver.

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MAIL COUPON NOW for complete facts about these two outstanding Du Pont wood preservatives.

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Please send me information on Copperized CZC and standard CZC.

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dustrial models with special equipment making them applicable to various types of industrial applications, the HRBI-400, HRI-400, HRIP-400, HRP-400 and HRP-401; and a marine model, HRM-400.—*Cummins Engine Co., Inc., Columbus, Ind.*

DETERGENT OILS—Two new heavy-duty detergent oils, Super Tenol and Tenol Extra, extended the application of Tenol into a broader field where heavier-duty service is encountered and where improper or high sulphur fuels are used. Super Tenol, the company states, meets the engine-test requirements of Army Specification 2-104 b Supplemental List I. It gives superior performance and engine cleanliness, full power under conditions of high temperature and extra-heavy duty, and at the same time thwarts the development of cold-engine sludge under conditions of long idling and stop-and-go operation. It also combats the problems presented through the use of improper or high sulphur fuels. Tenol Extra qualifies under Army Specification 2-104b Supplemental List II and also meets Caterpillar's requirements for Series 2 oils for use on supercharged engines, under conditions of abnormal heavy duty, and where high-sulphur fuels are used.—*Sinclair Refining Co., 630 Fifth Ave., New York 20.*

•

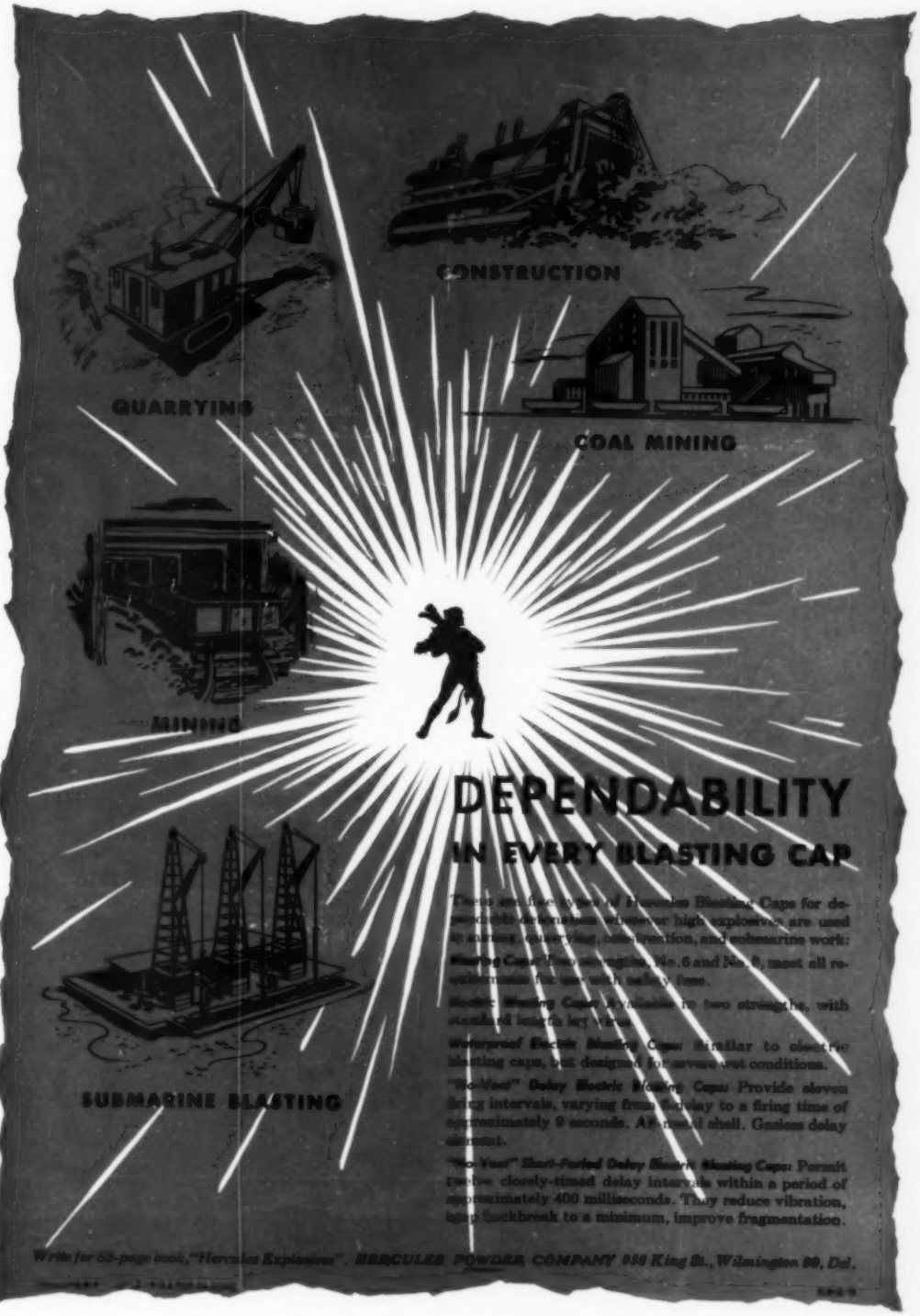
Equipment Shorts

EMERGENCY V-BELTS—Specially designed for emergency breakdowns and eliminating a large endless-belt inventory, Worthington Vee Ply belting is said to be adaptable to most V-belt drives, easily uncoupled from roll stock and adjustable to any length, without waste ends. Bulletin V-1400-B18 available.—*Multi-V-Drive Sales Division, Worthington Pump & Machinery Corp., Box 953, Buffalo 5, N. Y.*

WELDING HOSE—New-type dual welding hose consisting of green and red tubes of vinyl plastic "welded" together by heat and pressure is said to handle as easily as one hose, offer high burst pressure and extreme flexibility and to be oil- and fire-resistant.—*Goodyear Tire & Rubber Co., Akron, Ohio.*

TRUCK TIRE—All-Rib Highway tire specially designed for trailer wheels and front tractor wheels is said to reduce cupping and irregular wear, steer easier, wear longer and recap better, according to actual user experience cited by the manufacturer, and is available in six sizes.—*General Tire & Rubber Co., Akron, Ohio.*

MOTOR STARTER—New Type 371 wall-mounted full-voltage starter especially adaptable for corrosive-vapor- or combustible-dust-laden atmospheres has its entire mechanism im-


CONSTRUCTION
QUARRYING
COAL MINING
MINING
SUBMARINE BLASTING
DEPENDABILITY
IN EVERY BLASTING CAP
Waterproof Electric Blasting Caps: similar to electric blasting caps, but designed for severe wet conditions.
"Hi-Vest" Delay Electric Blasting Caps: Provide eleven firing intervals, varying from 0 delay to a firing time of approximately 9 seconds. Aluminum shell. Gasless delay element.
"Hi-Vest" Short-Period Delay Electric Blasting Caps: Permit twelve closely-timed delay intervals within a period of approximately 400 milliseconds. They reduce vibration, keep backbreak to a minimum, improve fragmentation.
Write for 68-page book, "Hercules Explosives". HERCULES POWDER COMPANY 938 King St., Wilmington 99, Del.

575 Tons an Hour
24 Hours a Day
CUMMINS DIESEL
For two years this Cummins-Powered Model 1201 Lima shovel worked 24 hours a day, six days a week for Tartelin Brothers Company, Inc., at the Company strip mine near Madisonville, Kentucky.
The shovel, powered with a Model LI-600 Cummins Diesel and equipped with a six-yard bucket, digs unblasted coal out of a thick seam and loads up to 575 tons per hour into a fleet of seven Cummins-Powered Euclid Coal Haulers. These hauling units carry up to 45-ton loads, and in one typical eight-hour shift, working on a three-mile round trip, moved a total of 4,300 tons.
Can you afford any other power?
CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA
EXPORT: CUMMINS DIESEL EXPORT CORPORATION • COLUMBUS, INDIANA, U.S.A. • CABLE: CUMDIEX

mersed in oil and sealed from the atmosphere, is weatherproofed for outdoor installation and is designed to control squirrel-cage motors and the primary of wound-rotor motors of 350 hp or less at 2,300 v.—*Allis Chalmers Mfg. Co., Milwaukee, Wis.*

PILLOW BLOCKS — Completely new line of normal and heavy duty spherical roller-bearing pillow blocks are self-aligning with either felt or triple metallic labyrinth seals for either straight-shaft or adapter-type mounting and will be available in bore sizes from 2 7/16 to 8 in.—*Fafnir Bearing Co., New Britain, Conn.*

LOCKNUT—New Security locknut available from ⅜ to 2½ in reportedly can be applied in either direction to stay securely in position, may be removed and re-applied without loss of locking power or distortion of bolt threads and is so designed that load or stress is borne entirely by the nut and not by the locking device.—*Security Locknut Corp.*, 1815 *North Long Ave., Chicago* 39.

CONTROL-CABINET HANDLE—Improved Westinghouse handle mechanism for circuit-breaker and control cabinets requires no critical adjustments, has facilities for three locks and constitutes a slamproof unit shipped in one piece to speed installation.—*Westinghouse Electric Corp., Box* 868, *Pittsburgh* 30, *Pa.*

SPRAY NOZZLE—Utilizing an unusual spiral design that is said to produce a finer atomization while practically non-clogging, new Bete nozzles shear from a single high-velocity jet a continuous film said to readily break into a uniformly fine particle at relatively low pressures, require no vanes or whirl discs and are available in various spray patterns with flow rates from ¼ to 100 gpm.—*Channing L. Bete Co., Inc.*, 20 *Federal St., Greenfield, Mass.*

PILLOW BLOCKS—Improved unit type of anti-friction-bearing pillow block, said to hold fast to high-speed shafts with a vise-like grip and stand vibration, is equipped with either ball or spherical roller bearings and is available completely assembled and

What's behind the dial ?

Behind the dial is the *heart* of your business—your records! Think—how could you continue after fire destroyed your inventory records, accounts receivable, tax records, deeds and contracts? How could you even establish proof of loss to collect your fire insurance? 4 out of 10 firms never reopen after losing their records! That's why your *safe* is so important!

How You Can Be Sure Of Your Safe

Look for the label of the Underwriters' Laboratories, Inc., on your safe. Don't trust *any* safe that doesn't have it! Modern Mosler safes pass their toughest tests with plenty to spare—you can *depend* on Mosler.
There's a Mosler safe to meet your requirements exactly, at less than you'd expect to pay. Find out about it now, before fire strikes! Fill in the coupon below and mail it *now.*

Mosler "A" Label Safe with burglary resistive chest for dual protection against fire and burglary.

The Mosler Safe Co.

Main Office: 320 Fifth Avenue New York 1, N. Y.
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Largest Builders of Safes and Vaults in the World

Builders of the U. S. Gold Storage Vault Doors at Fort Knox, Ky.

The Mosler Safe Co., Dept. 510
320 Fifth Ave., New York 1, N. Y.

Please send me: ☐ The new free booklet "What You Should Know About Safes."

☐ The Name of my nearest Mosler Dealer

Name_____

Business Address_____

City_____ State_____

CHOOSE THE COMBINATION SUITABLE FOR THE JOB!

There's a Schramm Size for every Requirement

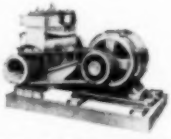
MODELS NUMBER 20 AND 35 COMPRESSORS . . . complete self contained engine driven units with capacities of twenty and thirty-five feet of actual air, available in a variety of mountings and assemblies.

SMALL INDUSTRIAL COMPRESSORS . . . from ¾ to 5 H.P. single or two stage with horizontal or vertical tanks, working pressures, single stage up to 150 pounds and two stage up to 200 pounds pressure.

SELF-PROPELLED CRAWLER TYPE COMPRESSOR WITH HYDRAULIC BACKFILL BLADE . . . a versatile unit that not only excels in furnishing air for pneumatic tools but can also be equipped with many other attachments.

MODEL 50 "BUILT-IN" MOTOR DRIVE . . . the overhead tank unit is only one of the many models and combinations of this small compact industrial compressor that can be bolted direct to any substantial floor.

TRAILER WITH STREAMLINED TOOL BOXES AND LIVE HOSE REELS . . . designed for quick handling, this trailer type is equipped with towing ring or universal coupling for attaching to car or truck.



"V" BELT DRIVE ON BASE WITH MOTOR . . . this type assembly has proved very popular because it permits the use of the most advantageous operating speeds where only odd frequencies and voltages are available.

MODEL #315 DIESEL ENGINE DRIVEN COMPRESSOR . . . a powerful and economical unit built for heavy duty work . . . will operate three hard-hitting rotating rock drills, or one big wagon drill. Some of the features include: electric push button starting, automatic start and stop control, centrally located control panel, SCHRAMM patented mechanical intake valves, and many other features.

WRITE FOR BULLETIN SE-48

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PA.

prelubricated for immediate installation in either "free" or "held" types in shaft sizes from 1 7/16 to 2 7/16 in. —*SKF Industries, Inc., Philadelphia.*

SAFETY SWITCH—New Type A HCI (high capacity interrupter) safety switch features an entirely new arc-quenching design and actuating mechanism said to provide ability to break unusually heavy loads quickly and safely and is available in 30-, 60- and 100-amp sizes. Bulletin TEC-10 is available.—*Trumbull Electric Mfg. Co., Plainville, Conn.*

NEW TOOL weighing less than 4 lb is said by the manufacturer to take the place of an arbor and assorted step plates in removing and replacing fans, ball bearings, races and seals from shafts, armatures, etc., and has a shaft range from less than ¼ to more than 1¼ in.—*Double B Tool Co.*, 1561 *E. 27th St., Cleveland* 14, *Ohio.*

COMPRESSED-AIR SHUTOFF—Automatic safety shutoff valve for compressed-air lines fitting standard connections closes instantly and shuts off pressure when break occurs to permit only a thin stream of air to escape through a bypass; opens automatically when pressure is equalized; can also be used for gases, steam and light liquids flowing under pressure. —*Olin Gas Engine Co., 9 Lafayette Ave., Buffalo, N. Y.*

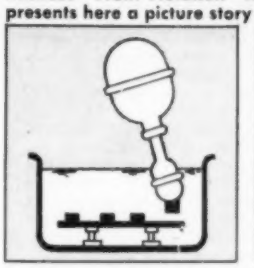
ELECTRIC PLANT—A new packaged electric plant features H-540 Le Roi engine directly connected to a packaged generator. The continuous-duty rating is 30 to 50 kw, with intermittent duty up to 75 kw.—*Carson Machine & Supply Co., Oklahoma City, Okla.*

GENERATOR SETS—New line of fully equipped self-contained trailer-mounted electric generator sets features capacities ranging from 10 to 85 kw. Available in both diesel and gasoline, 50 and 60 cycles, and in all standard voltages, these generator sets consist of an engine driving a generator, with an instrument panel containing all starting controls and switchgear, spring-mounted on a sturdy pneumatic-tired four-wheel

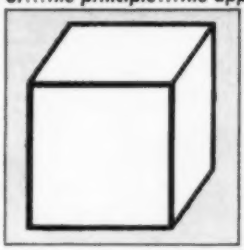
FLOTATION RECOVERY OF COAL FINES

the Principle... Application... Results

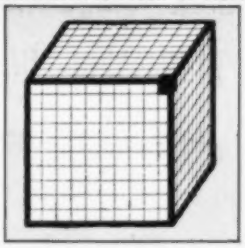
Because "Froth Flotation" is a relatively new process in coal preparation, the Denver Equipment Company presents here a picture story of...*the principle*...*the application*...*the result* of Flotation recovery of coal fines.



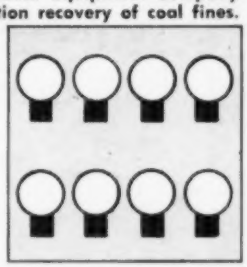
In 1903 it was discovered that bubbles would pick up chemically coated particles of mineral in a weak acid pulp and carry them to the surface. This selective mineral recovery principle is now used to recover fine particles of coal from high ash content wastes.



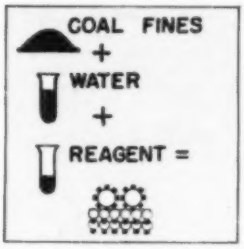
Bubble structure is important because small bubbles expose greater surface area for attracting coal than do large bubbles. Smaller bubbles have added strength and lifting power. Compare bubble to cube. A 1" cube has surface area of 6 square inches.



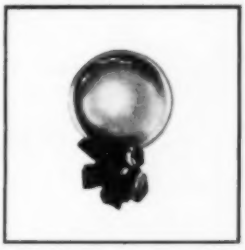
Same 1" cube, when divided into 1000 1/10" cubes has total exposed surface area of 60 square inches compared to only 6 square inches of original 1" cube. Result is greater available surface area for attracting and lifting fine particles of coal to surface.



A 1" cube of coal, broken to pass through 10 mesh screen would have similar increase in surface area. Increased surface area of bubbles attracts and carries fine particles of coal to surface. Coal particles 1/8" to 0" respond best to flotation.

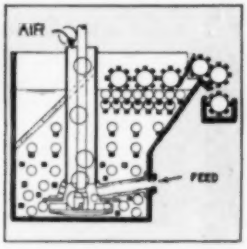


Coal fines are pulped with water. Reagents, usually kerosene or fuel oil, are added. Reagents affect coal differently than waste ash or gangue. Coal becomes "filmed" with reagents... waste does not. Bubbles are created which attract and adhere to coal fines.

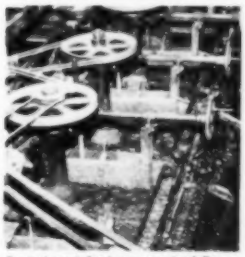


A chemical attraction between bubbles and reagent coated coal fines causes bubbles to attract and collect coal. Waste, not being coated with reagents, is not collected by bubbles. Photo by H. Rush Spedden is enlarged 83 times, shows small bubble carrying load.

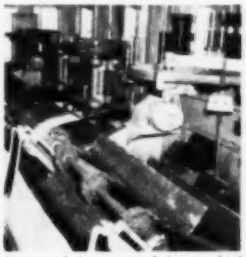
Enlarged photograph of several bubbles carrying particles to surface. Addition of pine oil or other froth producing reagent often aids in creating smaller more active bubbles which have greater attraction to the reagent coated particles of fine coal.



Flotation machine consists of tank to contain coal pulp, mechanism for agitating and creating bubbles, method of removing coal froth and means of disposing of tailings or waste. Over 33,000 Denver "Sub-A" Flotation Cells are serving the world around the world.



Typical coal froth on standard Denver "Sub-A's" recovering coal fines from waste material. Froth flotation is recognized as best method for recovering coal fines at low cost. Method is used extensively in Europe, Africa, South America... as well as U.S. and Canada.



Most coal is recovered in standard Denver "Sub-A's." Special conditions have resulted in special machines such as this one with deep digging froth removal rakes which remove and partially dewater the large volume of coal fines prior to drying for market.

Floating coal. Costs of recovering marketable product from coal wastes already at surface range from 20c to 50c per ton of recovered coal. Flotation feed comes from slurry water, silt, sludge, waste dumps, middlings, coal dust and high ash mine run coal fines.

Laboratory testing of coal fines accurately tells percentage, ash content and best method of recovery. Facilities of Deco's Coal Testing Division are available to any firm seeking to improve over-all net recovery of marketable coal. Write for details.

FLOTATION ENGINEERS

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

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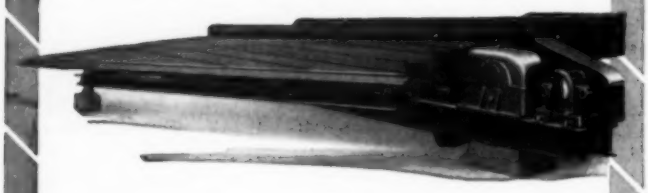
PUBLICATIONS AVAILABLE

• The complete story of Denver "Sub-A" Flotation appears in a new bulletin No. F10-B29. This bulletin together with other technical publications of value to Coal Preparation Engineers will be sent to you without cost or obligation. Please check below

- ☐ Denver "Sub-A" Flotation (No. F10-B29)
- ☐ Coal Flotation (Bulletin F10-B20)
- ☐ Coal Flotation at Pittsburgh Coal Company (Bulletin F10-B14)
- ☐ Coal Flotation at Sloss-Sheffield (M4-B52)
- ☐ Coal Flotation at Lehigh Navigation Coal Co. (Bulletin M4-B50)
- ☐ Denver-Dillon Vibrating Screens
- ☐ Denver Spiral Rake Thickeners
- ☐ Denver Adjustable Stroke Diaphragm Pump
- ☐ Denver Vertical Sand Pump

Name _____
Title _____
Company _____
Address _____

The Diagonal Deck *SuperDuty* Easily Excels in Washing Efficiency

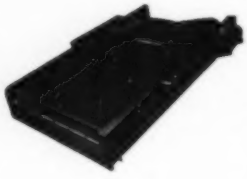


When it comes to producing high grade washed coal in the fine sizes at high capacity and with minimum lost coal in the refuse, the SuperDuty Diagonal Deck Coal Washing Table is far ahead of any other machine or process.

This high efficiency is due in no small part to the diagonal deck which places 75% more working riffles in the direct path of material flow.

Contributing also, are the balanced head motion, overall synchronization for adjustments and table action, the low power requirements and negligible maintenance cost.

For full information write for Bulletin 119.



FOR SCREENING ECONOMY

The Leahy Vibrating Screen possesses an uncanny ability to do a job right—and in record time. It screens wet or dry, using screen cloth or perforated plate. Excellent for dewatering or desanding. Range from 2" to finest mesh. Ask for Bulletin 14-H.

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CONCENTRATOR
COMPANY
901 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
COYCEMCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

trailer. The trailer is equipped with a steel-angle drawbar for attaching to truck or tractor.—*International Diesel Electric Co., Inc., 12-03 44th Ave., Long Island City 1, N. Y.*

ANTI-FREEZE—U.S.I. permanent anti-freeze, newest product of U.S. Industrial Chemicals, Inc., is described as of the ethylene-glycol variety, and is stated to provide guaranteed anti-freeze protection throughout the entire winter with just one fill. It is freezeproof, rustproof and boilproof. Supplements company's present Super Pyro and Penn Drake Type S anti-freezes—*Pennsylvania Refining So., 2686 Lisbon Road, Cleveland 4, Ohio.*

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Industrial Notes

Practicing what it preaches, the American Optical Co., Aug. 3, received the Distinguished Service to Safety Award of the National Safety Council at ceremonies held in Southbridge, Mass., and attended by Gov. Paul A. Dever of Massachusetts. The award, the highest honor bestowed by the Council for excellence in industrial safety, was won by the company's New England plants for working almost 3,000,000 consecutive man-hours without a single disabling injury and was presented by James L. Tanham, chairman of the Council's board of directors and a vice president of The Texas Co. During 1948, for every million man-hours worked, there were 1.1 accidents, 81% better than similar industries; and for every 1,000 man-hours worked, the lost time from accidents was only .03 of a day—91% better than similar industries. The award was accepted on behalf of the company by E. Weldon Schumacher, vice president, and Jesse A. Blackburn, safety engineer, and represents the fifth safety prize won by American Optical during the past four years.

Drill Master Supply Co., 1305 First Ave., Evansville, Ind., has been formed by James E. Rutledge and Kenneth C. Horn, formerly manager and assistant manager, respectively, of the Diamond Supply Co. The new jobbing firm will handle a wide range of drilling and other supplies and equipment for mines, road-building contractors and oil-well-drilling companies. Previous to joining Diamond Supply Co. in 1946, Mr. Rutledge was for 16 years associated with the Firestone Tire & Rubber Co. as a truck-tire representative and tire engineer. Mr. Horn, who joined Diamond Supply in 1945, had previously been with the Standard Coal Co., Vincennes, Ind., and other mining and contracting companies in Indiana and Illinois.

Louis W. Huber, vice president, National Mine Service Co., died sudden-

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A Mack six-wheeler on your hauling job brings you profit-building advantages offered by no other make of truck—advantages that mean outstanding performance and economy.

Power Divider—Positive traction regardless of terrain

Inter-axle Differential—No wind-up or overstress of driving parts

Mack Rubber Shock Insulators—No spring twist—No lubrication

Maximum Flexibility—No chassis distortion

Self Steering—No tire scuffing

Uniform Tire Loading—Longer tire life

Uniform Braking—Better control

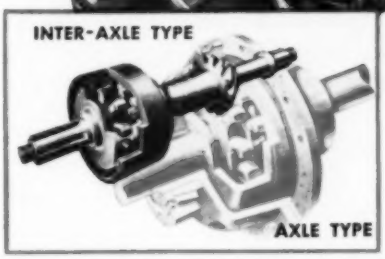
No weight transfer between axles

No bogie hopping, rearing or toe-stubbing

Simplicity of Design—No adjustments—Minimum maintenance.

Mack BALANCED BOGIE

Balanced Bogie—designed and built exclusively by Mack for Mack six-wheelers.



Mack Power Divider—exclusive in the Mack Balanced Bogie.

For full information on Mack's Balanced Bogie and exclusive Power Divider—what they can mean to you in trouble-free, uninterrupted schedules; in lower costs and increased profits—see your nearest Mack branch or dealer.

IT'S PART OF THE LANGUAGE:

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Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Limited.

Gorman-Rupp Self-priming, Centrifugal Mine Gathering Pumps are engineered to meet exacting mine requirements.

LOWEST FIRST COST You get more for your money when you buy Gorman-Rupp Mine Pumps. They maintain nearly normal capacity under any working head. Frictional loss and increased lifts do not greatly affect their efficiency. Smaller capacity Gorman-Rupp pumps can often be used where larger, more expensive units of other makes would otherwise be required.

COSTS LESS TO MAINTAIN Absolute simplicity - only one moving part, the impeller. Wearing parts quickly and economically replaced with common tools.

NO COSTLY SHUTDOWNS Absolutely dependable - run indefinitely without shutdown requiring little or no attention. Sand, muck or solids that will pass the intake strainer will not clog or harm these pumps. Automatic priming--ideal for remote location and control.

LOW HEAD ROOM Gorman-Rupp design permits very small headroom - from 13½ to 21¼ inches depending upon size (pump only). Available in capacities from 50 to 200 GPM and heads up to 125 feet.

SPECIAL ALLOYS Pumps are built of three different metals to meet various mine water requirements.

GUARANTEED every Gorman-Rupp pump carries the maker's positive guarantee. Inquiries invited: ask for Mine Bulletin No.301-46.

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Guyan Machinery Co., Logan, W. Va.
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Hoe Supply Co., Christopher, Ill.
Greenville Supply Co., Greenville, Ky.
General Machinery Co., Birmingham, Ala.
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Athens Armature & Machinery Co., Athens, Ohio.
Tennessee Mill & Mine Supply Co., Knoxville, Tenn.
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Reliable Electric & Equip. Co., Zanesville, O.
Cambridge Mach. & Supply Co., Cambridge, Ohio.
Medico Elec. & Motor Co., Pittston, Pa.
Buckeye Machine Supply Co., New Philadelphia, Ohio.
W. Va. Pump & Supply Co., Huntington, W. Va.
Central Mine Supply Co., Mt. Vernon, Ill.

THE GORMAN-RUPP COMPANY
305 BOWMAN STREET, MANSFIELD, OHIO

ly Aug. 17 at the Pineville Community Hospital, Pineville, Ky., following a heart attack while enroute to Middlesboro from his headquarters in Lexington. Since graduation from the University of Illinois in 1921, Mr. Huber had been closely identified with the mining industry in teaching, sales, and consulting capacities and had been active in mine ventilation, safety and rescue work. From 1928 to 1948, when he joined National Mine Service, he was associated with Mine Safety Appliances Co., where he was district manager.

Henry N. Muller Jr., manager of the educational department of the Westinghouse Electric Corp., Pittsburgh, Pa., has been named assistant to the vice president in charge of engineering, with expanded responsibilities in the engineering field in addition to his present position. In the company's industry sales departments, R. S. Kersh has been appointed manager of central station sales and F. D. Weatherholt, formerly assistant manager of industrial sales, has been named manager to succeed Mr. Kersh. W. J. Howell, formerly assistant to the Pacific Coast district manager, has been named assistant to Tomlinson Fort, manager of apparatus sales.

Henry W. Dodge has joined Mack Trucks, Inc., New York, as executive vice president. Mr. Dodge, formerly chairman of the board and director of Air Products, Inc., had been on loan to ECA as chief of petroleum in Paris when he joined Mack. He previously had been vice president and general sales manager of The Texas Co.

International Harvester Co., Chicago, has just announced plans for construction of a wholesale parts depot, costing approximately $1,000,000, in South Memphis, Tenn. The depot, expected to be ready for occupancy next spring, will be built on a 5-acre plot and have 138,000 sq ft of floor space available as a wholesale distribution center for parts for all Harvester products, serving both dealers and company district operations in various surrounding states. The new facility, employing 200 people, will be one of 11 depots being installed throughout the country to provide customers with speedy parts service.

Western Machinery Co., San Francisco, has completed negotiations with Bethlehem Steel Co. for the assignment of exclusive manufacturing and sales rights for Steffensen Flotation machines, which are the pneumatic type employing an air-dispersion principle to produce quantities of small bubbles with a high total bubble area. The units will be manufactured in Wemco's Sacramento, Calif., shops.

R. G. LeTourneau, Inc., Peoria, Ill., has reorganized its service department into three territories, with Cloyd W. Richards heading the department as general service manager. Pat Edwards is Eastern service manager;

MUDDLING in High Places

It is time for men in Washington and London to stop toying with the problem of international trade. We of the democratic West are at a turning point in our economic affairs. A false step by either the United States or Britain could lead quickly to disintegration of trading between the people of the world as we have known it for the past hundred years. Recent meetings of diplomats in London and Washington have not lifted us out of this danger.

By two simple tests you and I can measure the sincerity of the men in Washington and in London who are trying to solve what they call "the dollar crisis."

One test applies to the British: Is Britain making an honest effort to re-establish itself as a real competitor in world markets?

The other test applies to us in the United States: Are we willing to see Britain re-emerge as a strong competitor in world markets—even in our own home market—and to help her do so?

Today, even though both countries have faced the devaluation test, the answer to these questions probably is no.

I

The situation we face is, in fact, unprecedented. In every important industrial country of the non-Communist world, except Germany and Japan, production is above prewar volume, thanks largely to the Marshall Plan. Yet trade between nations is shackled as it has never been since the 18th century. And the shackles grow day by day. What is worse, two distinct trading areas—the dollar area and the sterling area—have grown up in the non-Communist world, and the gulf between them grows wider.

What kind of leadership have the United States and Britain had in the face of this crisis? President Truman late in August wisely checked the trans-Atlantic bickering over the dollar crisis. *But Mr. Truman showed no awareness of the basic question that the American people must soon decide: Is the United States able and willing to generate trade between nations, as Britain did in the 19th century?*

What have British leaders offered us? Foreign Secretary Bevin and Chancellor Cripps called their September visit to Washington "one of the most important missions in history." *But they did not tell the British people, and perhaps do not admit themselves, that their Labor government must change its internal and external policies if Britain is ever to earn its living in a competitive world.*

Admittedly, the problem Britain has faced since 1945 is a colossal one. But, in the face of its grave difficulties, what has Britain done? The working day was shortened. Welfare economics have run riot. High taxes have sapped incentives. Labor and capital have clung to their prewar psychology of cartels and featherbedding. Government controls and government trading have hamstrung private initiative. Nationalization schemes have injected politics into the struggle for industrial recovery.

Thus the policies of the Labor government have made Britain's adjustment to its new position in the world immensely more difficult. But Americans who attribute the danger of an international breakdown to British socialism greatly oversimplify the problem. Virtually every country in the world, socialist or not, faces the same dollar crisis that Britain faces.

continued on next page

We Americans must recognize that our economic strength unbalances world trade as does Britain's weakness. World War II increased America's superior power to produce goods. It also made the United States more self-sufficient. Thus, while the world demand for American goods has risen, our demand for foreign goods, except for basic raw materials, has not increased. Today we sell more to every major area of the world than we buy from it—and yet we wonder why there is a dollar crisis.

It is time for us to recognize that there are two fundamentally conflicting pressures at work in the United States. One is our desire for a big surplus of exports over imports. The other is our desire for a system of free-wheeling trade around the world. We can not have both unless we as taxpayers wish to subsidize our exports. Which do we want?

Curtis E. Calder, chairman of the International Relations Committee of the National Association of Manufacturers, says, "The battle of the foreign trade gap is essentially that of reconciling our urge to export our surpluses with a reluctance to accept imports in payment for them . . . The dilemma is an uncomfortable one to face."

II

Here, then, are the basic questions that confront men in Washington and London. Does Britain really want expanding world trade or a high-cost welfare state? Does the United States really want expanding world trade or a huge surplus of exports? So far politicians in Washington and especially in London have ducked these issues because they are political dynamite.

If the people of Britain decide they want to regain their position as a competitive trader in expanding world markets, here are specific objectives that men in London should set for themselves:

1. Lower government costs. The British Treasury has asked for cuts of 5% in 1950. But a cut nearer 15% will be necessary, even if that means fewer government subsidies and health services. Enterprise will never revive nor costs come down while taxes take 40% of the British national income, including roughly 60% of business profits.

2. Fewer government controls. Only by removing controls and allocations (except on a few necessities) can Britain begin to return to prices fixed by competition rather than by government fiat.

3. Stronger anti-monopoly legislation for both business and labor. Britain needs a concerted drive against all forms of restrictive, high-cost practices. This drive should put teeth in the anti-monopoly act and supplement it with legislation to end restrictions imposed by trade unions.

4. Less restrictive trading practices. Britain should retreat gradually from its international barter between governments if competition is ever to have free play in international trade.

Meanwhile, if we of the United States sincerely want multilateral world trade, men in Washington must face up to four problems and hammer out workable solutions:

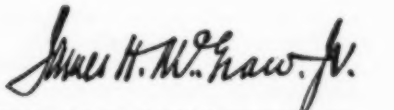
1. Use of the International Monetary Fund to back a devalued pound. In time the Fund, in which we have the controlling voice, might be used to promote convertibility of pounds into dollars.

2. Help for Britain in meeting war-created external debts. This might mean support for London in getting a reduction of the war debts Britain owes India, Pakistan and Egypt, for example. To achieve such a debt reduction for Britain we might have to underwrite a part of a Southeast Asia recovery program.

3. Encouragement of American investments abroad. Such investments should be directed primarily into enterprises which will earn dollars, such as the development of new sources of raw materials, or which will raise productivity abroad.

4. Our own tariff barriers. Our attitude toward this critical issue will be the acid test of how deeply we believe in the merits of free world competition.

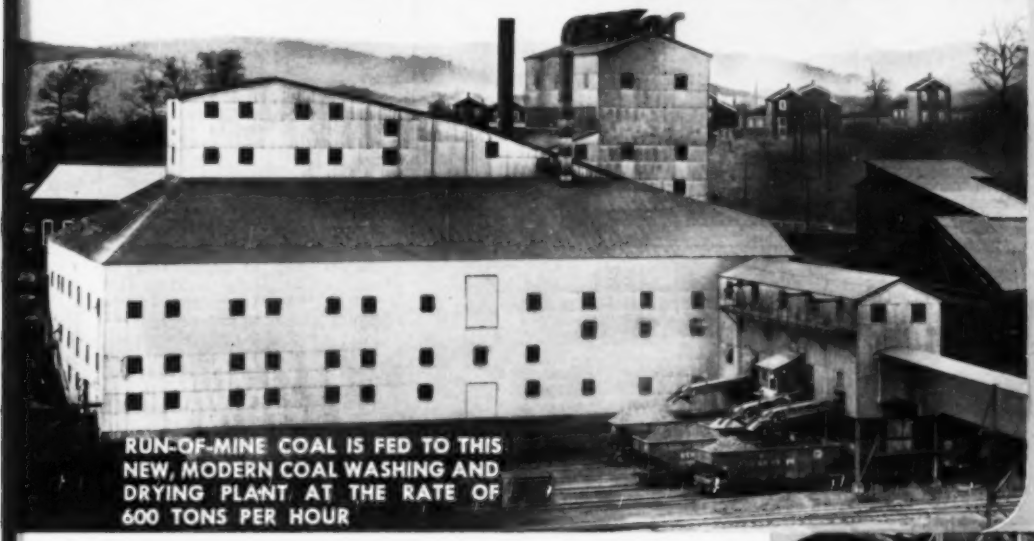
If we really want free, competitive trading between the people of the world, these issues must be met and resolved by leaders on both sides of the Atlantic. If we do not want to face these issues, then let us resign ourselves to a world walled off into three trading areas: the Communist bloc, the sterling area, and the dollar area. So far, Washington and London have muddled along, except in facing the devaluation problem. Clarity and courage are still needed.



President, McGraw-Hill Publishing Company, Inc.

Another *Heyl+Patterson* Coal Preparation Plant

that was SPECIALLY and INDIVIDUALLY ENGINEERED



RUN-OF-MINE COAL IS FED TO THIS NEW, MODERN COAL WASHING AND DRYING PLANT AT THE RATE OF 600 TONS PER HOUR

Heyl & Patterson recently completed this modern Coal Preparation Plant for a large coal company in the West-Central Pennsylvania field. Like every Heyl & Patterson project it is complete in every detail.

Complete . . . because it embodies engineering, fabricating and erecting by Heyl & Patterson plus the selection and use of nationally accepted products that combine to provide the utmost in operating efficiency.

In this plant a 9′ x 15′ Bradford Breaker reduces run-of-mine to minus 5″, screening out large pieces of rock and other foreign material. 5″ x ⅜″ coal is washed in two Chance Cones, 12′ and 13′ 6″ in diameter, at different separating gravities. The middling product is used for steam purposes. ⅜″ x 0 coal is fed to a battery of 18 Diester tables. 5″ x ⅜″ Clean coal is dewatered on screens. ¾″ x ⅜″ coal is heat dried in a Vissac dryer. ⅜″ x 0 coal is dewatered by means of a drag type sludge tank, C. M. I. dryers, Dorr Thickener and vacuum filters. All ⅜″ x 0 coal is dried in Raymond Flash Dryers.

Large sludge tank capacity has been provided to handle the high tonnage of ⅜″ x 0 coal. Coal at 22% moisture is delivered to three C. M. I. Centrifugal Dryers.

Three Raymond Flash Dryers dry 180 tons per hour of ⅜″ x 0 coal from 8% to 2% moisture.

Let us tell you more about the Heyl & Patterson method of coordinating the design, fabrication and erection of Modern Coal Preparation Plants.

18 Deister Tables

The battery of Deister Tables, shown here, is cleaning 200 tons per hour of ⅜″x 0 coal. Tables are carried on concrete supports built integral with concrete floor.

Ore Bridges
Railroad Car Dumpers
High Lift-Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling Equipment
Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
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CONTROL COAL DUST with Pangborn Dust Control

PANGBORN Dust Control Equipment gives you:

- efficient coal dust disposal and reclamation
- increased safety
- improved working conditions
- lower equipment maintenance cost
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In scores of coal preparation plants, Pangborn Dust Control installations have paid off over and over again by improving working conditions, eliminating dust nuisances, cutting maintenance costs, doing a superior job of dust disposal and reclamation. By effectively collecting the fine coal dust produced in the operation of tipples, dry cleaning, de-dusting and other preparation facilities, Pangborn has become a by-word for making profit-stealing coal dust *behave*.

Whatever your dust problem—high machinery maintenance, nuisance, lost profits through faulty reclamation—Pangborn engineers can help you with an economical and effective solution. Let us make a *dust pocket survey* for you. No obligation—but with the information it gives us, we can recommend the right Pangborn Dust Control Equipment to rid your plant of dust hazards and nuisances.

Write for Bulletin 909A, "The Control of Industrial Dust." PANGBORN CORPORATION, 288 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for all the latest developments in Dust Control and Blast Cleaning Equipment.

STOP THE DUST HOG from stealing profits with

Pangborn DUST CONTROL

George Crafton, Central service manager; and Jack Lewis, Western service manager; and Clyde E. Clair, special service representative. All have headquarters at Peoria. Carl D. Smith, associated with Firestone Tire & Rubber Co. for 26 years, has joined LeTourneau as a special representative of the sales division, with headquarters in Peoria.

Hercules Powder Co., Wilmington, Del., has named J. J. Kelleher to the newly created position of assistant sales manager of its explosives department. L. C. LeBron, his assistant, has been appointed to succeed Mr. Kelleher as manager of the contractors division.

Howard H. Weber has been named general sales manager of the wire and cable department, United States Rubber Co., New York. Four divisional managers for the department appointed by Mr. Weber include: Clarence H. Le Vee, eastern division sales manager, New York City; J. A. Leuver, western division sales manager, Chicago; Don B. Karlskind, southwestern division sales manager, Dallas, Texas; and L. M. Guibara, Pacific Coast division sales manager, Los Angeles.

McNally Pittsburg Mfg. Co., Pittsburg, Kan., has opened two new engineering service offices for the servicing of plants presently in operation. Jerome V. Lentz has been placed in charge of the Terre Haute, Ind., office, and Irving M. Craig in charge at Charleston, W. Va.

John A. Roebling's Sons Co., Trenton, N. J., has opened its new building housing an office and warehouse at 4801 Jackson St., Denver, Colo., with Homer H. Davis, Roebling representative in Denver for 23 years, as manager, and Roy H. Hainsworth as his assistant.

C. C. Bray has been appointed regional supervisor of the new Midwestern district office recently opened by the IMO-De Laval Products Division, De Laval Steam Turbine Co., Trenton, N. J. The new office, located at 1500 South Western Ave., Chicago 8, has complete facilities for handling sales and service of various IMO-De Laval products. F. H. Bagley has been transferred from the De Laval Chicago district office to the new office.

Pennsylvania Crusher Co., Division of Bath Iron Works, Philadelphia, has promoted Woodrow W. West to chief sales engineer.

Penn Machine Co., Johnstown, Pa., has appointed Chester W. Brasher general manager, succeeding North C. Shaver, who has relinquished his duties because of ill health.

T. W. Simmons Jr. has been elected vice president and general manager, and Kenneth G. Lundie, general sales manager, Johnston Pump Co., Los

Utilities who know the B&O *expand their plants with confidence!*

BITUMINOUS IS BASIC in the production of light and power. And to many a utility man, that means bituminous mined on the Baltimore & Ohio.

And to executives with programs of expansion on their hands, B & O coals offer an economical, practically *unlimited* supply of fuel. Whether high-, medium-, or low-volatile coals are required, they are found in abundance and wide variety on the B & O. And their accessibility, particularly to the Great Lakes regions and the eastern seaboard, speaks for itself.

The vast, untapped reserves on B & O lines make bituminous a deciding factor in expansion "go aheads." In normal times or in emergencies, you can "bank on B & O bituminous." ***Ask our man!***

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Constantly *doing things*—better!

FOR HARD FACING AND REPAIR

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WELDING
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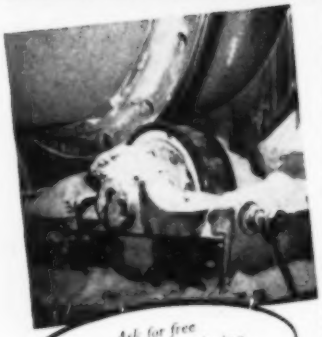

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Toolface
FOR HARDNESS AND TOUGHNESS

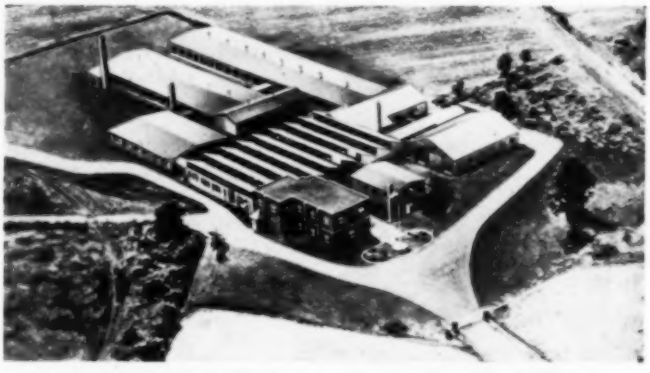
Trunnion wheels, operating in limestone dust under 40 tons pressure, are hard-faced with Amsco TOOLFACE for long wear. TOOLFACE provides abrasion resistance up to 1100°F. where toughness is required; in this range TOOLFACE is both harder and tougher than the popular cobalt base alloys No. 1 and 6. Typical TOOLFACE applications are steel mill tong bits, lumbering chipper knives and metalworking cutting tools. TOOLFACE rods and electrodes are high speed steel with 575-675 BHN deposit hardness . . . weld readily to mild steel. Welded parts may be forged, softened for machining and re-hardened.

Brake Shoe
AMERICAN MANGANESE STEEL DIVISION

409 E. 14th St., Chicago Heights, Illinois
Offices in Principal Cities

Manhattan Rubber Installs Giant Conveyor-Belt Press

SAID TO BE THE WORLD'S LARGEST, this new precision hydraulic press for vulcanizing conveyor belts under controlled pressure and temperature has recently been put into successful operation at the Passaic, N. J., plant of the Manhattan Rubber Division, Raybestos-Manhattan, Inc., to meet the demand for more and larger conveyor belts for mining and other industry. Built to Manhattan Rubber's specifications by the Baldwin Locomotive Works, the assembled press weighs about 320 tons and has 40-ft platens each weighing 45 tons. Eight controllers operating individual control systems are synchronized to maintain uniform pressure and temperature on each platen during the vulcanizing process, with the result that less than a 2-deg temperature variation occurs over any one platen surface even though the total surface area of the press is equal to that of a bowling alley, the company reports.



Cambridge Wire Cloth Expands Production Facilities

AN 18,000-SQ FT ADDITION to its home plant in Cambridge, Md., has been completed by the Cambridge Wire Cloth Co. The new bay, built especially to house the company's wire-fabrication department, includes new and modern machinery and equipment designed to provide more extensive production facilities for the department.

Angeles. Mr. Simmons formerly was president, Johnston Aquamatic Co., York, Pa., and Mr. Lundie formerly was western sales manager, Pomona Pump Co., Pomona, Calif.

T. R. Colville has been appointed advertising manager of the Pump Division, Byron Jackson Co., Los Angeles. Mr. Colville formerly was with the advertising division of the chemical department of the General Electric Co.

Utilities Electrical Machinery Corp. has been reincorporated under name of Utilities Machinery Corp., with a new address, National City-East Sixth Bldg., Cleveland 14, Ohio. Officers are: J. W. Kohn, president, M. S. Kohn, general manager, and George Kohn, vice president.

Joseph H. Parsons and Robert B. Pogue have been appointed vice presidents and Rosser L. Wilson chief engineer of the Brake Shoe and Castings

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For maximum production . . . top efficiency . . . lowest operating cost, give your machines the finest in lubricants—give them Tycol oils and greases.

Tycol lubricants are made to meet every lubrication need of industry—from roll neck greases for steel mills to spindle oils for textile plants.

Each Tycol lubricant is subjected to rigid tests during manufacture. This control assures the required lubrication characteristics—*COLOR, penetration, viscosity, to name a few—for maximum performance of that particular product. At every step from selection of crudes to blending of the finished product, Tycol lubricants provide maximum lubricating efficiency which means greater economy, longer life for every type of equipment.

Tide Water Associated will be glad to assist you in selecting the Tycol lubricant best suited to your specific need. Call or write your nearest office for further details.

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McNally Pittsburg Extends Coal-Preparation Research

NEW COAL-RESEARCH LABORATORY scheduled for November completion by the McNally Pittsburg Mfg. Co., Pittsburg, Kan., will add 4,500 sq ft to space currently used for research and will permit extension of the company's work on coal preparation, with long-range studies being maintained on a continuing basis using commercial-sized equipment. A continuing series of tests on equipment operation and efficiencies also are scheduled for the new laboratory. With its expanded facilities, McNally Pittsburg will continue to offer the coal industry, on a consulting basis, the sink-float, screening and ash-determination analyses provided for many years.

Division, American Brake Shoe Company, New York. Mr. Parsons, formerly assistant vice president, will be in charge of miscellaneous castings sales and Mr. Pogue, formerly chief engineer, continues in charge of engineering. Mr. Wilson was previously assistant chief engineer.

Hewitt-Robins, Inc., Buffalo, N. Y., has named the Hines Bearings & Industrial Supply Co., Billings, Mont., distributor of Hewitt industrial rubber products in Billings and surrounding territory.

Hobart Bros. Co., Troy, Ohio, has appointed J. E. White, 1802 South Seventh St., St. Louis, Mo., a distributor for its complete welding line, operating under the name of Hobart Welder Sales & Service and covering a number of counties in Missouri and Western Illinois.

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland, Ohio, has appointed Edgar E. George district sales representative, with headquarters in High Point, N. C. James H. Rigby is associated with Mr. George, who formerly was president, Mirro-Products Co., High Point, N. C.

Cardox Corp., Mining Division, has appointed the Layne-Minnesota Co., Minneapolis, Minn., as the new drilling-equipment distributor for the southern half of Minnesota, North and South Dakota and Montana. Layne-Northwest Co., Milwaukee 13, Wis., has been named Cardox-Hardsocg surface-drilling equipment distributor for the southern half of Wisconsin.

Babcock & Wilcox Co., New York, has added to the chemical laboratory staff of its research and development department in Alliance, Ohio: Hayden Jones Jr., M.S. in Chemical Engineering, Iowa State College; Norman Phil-

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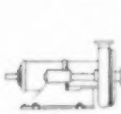
NAGLE PUMPS CAN HANDLE IT!

This sand is "tougher than a tax collector's heart," but the soundly engineered design and correct materials used in Nagle Pumps enable them to handle this material with ease and minimum wear!

Note these important features: The proper material in the water end parts to meet the specific type of abuse . . . The proper type of impeller to meet the conditions efficiently . . . The proper design to provide adjustment, accessibility and ease of replacement. Send for Catalog!



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INDUSTRIAL PUMPS FOR ABUSIVE APPLICATION
1737 CENTER AVE.
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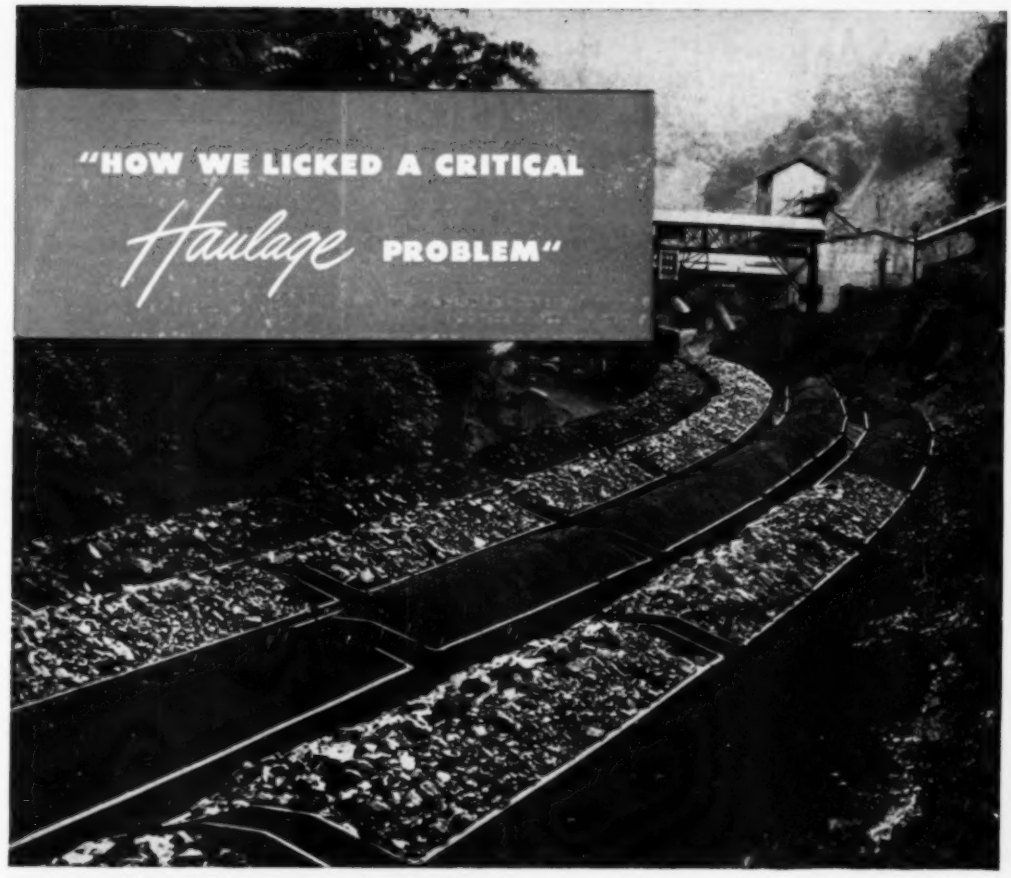
"HOW WE LICKED A CRITICAL *Haulage* PROBLEM"



"PROPER LUBRICATION of our company-owned mine cars brought immediate results in our operations. The recommended Cities Service Trojan greases for journals and wheel bearings resulted in longer car life, lower power requirements to move cars and enabled our locomotives to handle longer trains.

"Cost of haulage dropped from more than 35% to less than 22% of our total mine operating costs. We used Trojan greases recommended by the Cities Service lubrication engineer."

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- Air compressor oils
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Free—A new fact-filled booklet: COAL MINING MACHINERY LUBRICATION is available upon request. Write Cities Service Oil Company, Room 490 Sixty Wall Tower, New York 5, N. Y.

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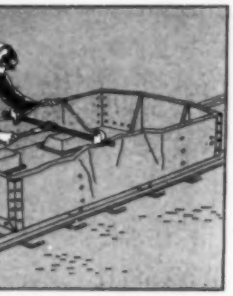
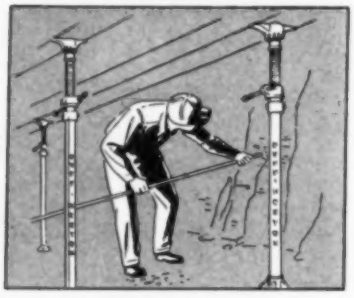
DUFF-NORTON JACKS

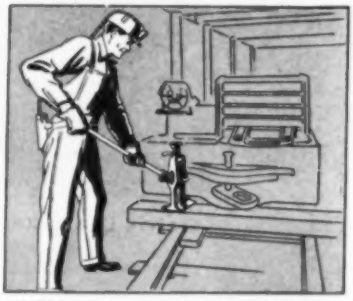


Push and Pull Jack used for straightening sides, ends and sills of mine cars.



Mine Roof Jacks support mine roofs, cross timbering and protect working face areas.

Automatic Lowering Jack



Illustrated is a five ton automatic lowering jack rerailing a mine car. Convenient and economical.

Duff-Norton Mine Jacks, available in a wide variety of styles and capacities, meet exacting requirements for every lifting, lowering, pushing or pulling job in and around your mine. These jacks more than pay for themselves in a short time with savings in time, effort, labor and money.

Write today for your copy of this new "Handy Guide" for selecting

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"The House that Jacks Built"

lips, B.S. in Fuel Technology, Pennsylvania State College; and Earle Young Jr., B.S. in Chemical Engineering, Carnegie Institute of Technology.

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Trade Literature

Available Without Charge on Request to the Manufacturer

ABRASIVE - RESISTANT RUBBER—B. F. Goodrich Co., Akron, Ohio. Catalog section offers details of construction, specifications and recommended uses for various grades of Armorite, described by Goodrich as the toughest abrasive-resistant rubber known, for use in lining chutes, pipes, sandblast cabinets, launders and other similar applications.

ALLOY — Electro - Alloys Division, American Brake Shoe Co., Elyria, Ohio. Bulletin, "How to Reduce Abrasive Wear with Thermalloy HC-250," describes physical properties of Thermalloy HC-250, listing uses and advantages for this material said to be exceptionally abrasive-resistant, with case histories and information on machining and high-temperature service.

ALLOY STEELS—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Booklet, "How to Specify and Buy Alloy Steel With Confidence," discusses the various control steps which should be taken to purchase and use alloys with complete confidence that they will give the service required. Also included in the booklet is an explanation of the end-quench hardenability test, data on buying alloy steel on the basis of hardenability, and information on standard and special types of alloy and carbon steels, including aircraft quality, free cutting bars and tool steels.

BELT CONVEYORS—Lippmann Engineering Works, 1603 W. Mitchell St., Milwaukee 11, Wis. Bulletin 1400 presents detailed information on stationary, portable and 16 types of special-purpose belt conveyors, both troughed and flat belt and includes applications and methods of selection of belt conveyors, dimensions, weights and specifications for standard head, tail and intermediate sections, lattice, channel and timber frames, and terminal machinery.

BELT-CONVEYOR EQUIPMENT—Industrial Division (Dept. G), Continental Gin Co., Birmingham 2, Ala. Engineering Data Book ID-481, "Continental Belt Conveyors," covers the Continental Gin line of conveyor parts and equipment, with illustrations, dimensions, specifications and prices, along with considerable engineering and installation data on belt conveyor applications.

CORE - DRILL SUPPLIES AND EQUIPMENT—Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa. Bulletin D-18, "Joy Core-Drill Supplies and Equipment," covers auxiliary core drilling equipment for core or diamond drills. The catalog contains illustrations and specifications for a complete line of core barrels, bits, drill rods and other equipment necessary for diamond-core-drilling operations. Joy requests that the type core drill on which equipment will be used be stated in requesting the bulletin.

DEEPWELL PUMPS—Byron Jackson Co., Pump Division, Box 2017 Terminal Annex, Los Angeles 54, Calif. Bulletin describes Byron Jackson's oldest line of pumps, the deepwell pump featuring three distinct types of bowl assemblies to provide widely varying well diame-

This powerful, high-speed locomotive, designed for long gathering-points-to-tipple runs, gets loaded cars out, empties back in, at new time- and money-saving speeds.

NEW 30-TON GENERAL ELECTRIC MINE HAULAGE LOCOMOTIVE

MOVES MOUNTAINS *Safely*

If you want to move mountains of coal quickly, inexpensively, and safely, here's the unit for you.

IT HAS POWER . . .
up to 18,000 lbs maximum drawbar pull!

IT HAS SPEED . . .
up to 35 mph maximum permissible speed!

And it's good sense that a unit which operates with less strain on track and equipment gives maximum assurance against mishap to personnel and equipment.

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Here are a few of the safety features of this unit:

WEIGHT IS DISTRIBUTED over four axles to reduce concentrated load and lateral force on tracks.

SHORT, RIGID WHEELBASE, low inertia, and swivel connections of trucks permit wheels to follow rails freely, without binding or straining.

SHORT OVERHANG at ends prevents teetering or galloping, promotes smooth riding.

Call in a G-E mine locomotive specialist for detailed discussion of all your haulage problems. Meantime, write for bulletin GEA-4774A. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

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ters, capacites, heads, etc., plus several impeller designs available for each size and type, thus providing more than 100 individual impeller designs of different hydraulic characteristics.

ELECTRIC MOTORS—General Electric Co., Schenectady 5, N. Y. Bulletin GEA-4468A describes construction and operation of GE unit-cooled dc motors for dusty, dirty, or oil-laden atmosphere.

EYESIGHT - CONSERVATION PROGRAM—American Optical Co., Southbridge, Mass. Booklet describing sight conservation programs in industry, "Improved Industrial Vision, A Bonus for Management, A Benefit for Employees." features case histories and charts demonstrating the cost saving values of an industrial safety and visual efficiency program. Developed by AO in cooperation with industry and the ophthalmic professions, the plan provides for a rapid check of vision of industrial employees to locate those who could benefit by a complete visual examination and correction.

FLEXIBLE METAL HOSE—Atlantic Metal Hose Co., 123 West 64th St., New York 23. Catalog 100 covers new uses for existing types of flexible metal hose to meet various problems and includes accessories, test tables, installation methods and applications.

MAINTENANCE RECORDS—Remington Rand, Inc., Systems and Methods Research Dept., 315 Fourth Ave., New York 10. Folder KD-449 describes record control systems designed to facilitate and systematize preventive maintenance of machines and equipment, plus information on inventory control systems.

MINE SUPPLIES AND REPAIR SERVICE—National Mine Service Co., Beckley, W. Va. Bulletin 494 discusses the varied operations of National Mine Service, including examples of typical manufacturing and repair facilities at the Bemeco and All-State divisions and information on all products produced and distributed by National.

PAINT-COLOR SELECTION—E. I. duPont de Nemours & Co., Inc., Wilmington, Del. New "Color Condition" manual recommends use of proper paint colors in coal mines to improve visibility, increase safety and boost worker morale. The manual, utilizing proven psychological and functional values of colors, covers shaft, slope, and drift mines; mine buildings and offices; homes, churches, stores and schools in mine communities; and also deals specifically with various mine equipment.

PIPE TOOLS—Beaver Pipe Tools, Inc., 349 Dana Ave., Warren, Ohio. Catalog 49 covers the complete Beaver line of hand and electric power tools for cutting and threading pipe, bolts and conduit, with details of operation and specifications.

ROTARY DRYERS, KILNS, COOLERS—Hardinge Co., Inc., 240 Arch St., York, Pa. Bulletin 16-D on the complete line of "Ruggles-Coles" units discusses direct, semi-direct and indirect heat dryers, double-shell and single-shell dryers, parallel-flow and counter-flow dryers, steam-tube and hot-air dryers; air-type, water-spray, and partially submerged type rotary coolers; counter-flow rotary kilns for calcining, roasting or oxidizing. Over-all dimensions of all models as well as typical "flow sheets" are included.

TRANSMISSION BELTING—U. S. Rubber Co., Mechanical Goods Division, Rockefeller Center, New York 20. Catalog covering detailed design, engineering and performance data for the U. S. Rubber line of transmission belting includes tables on belt speeds, arc of contact, friction, horsepower correction, service factors, hints on the proper belt selection and procedure for analyzing belt drives.

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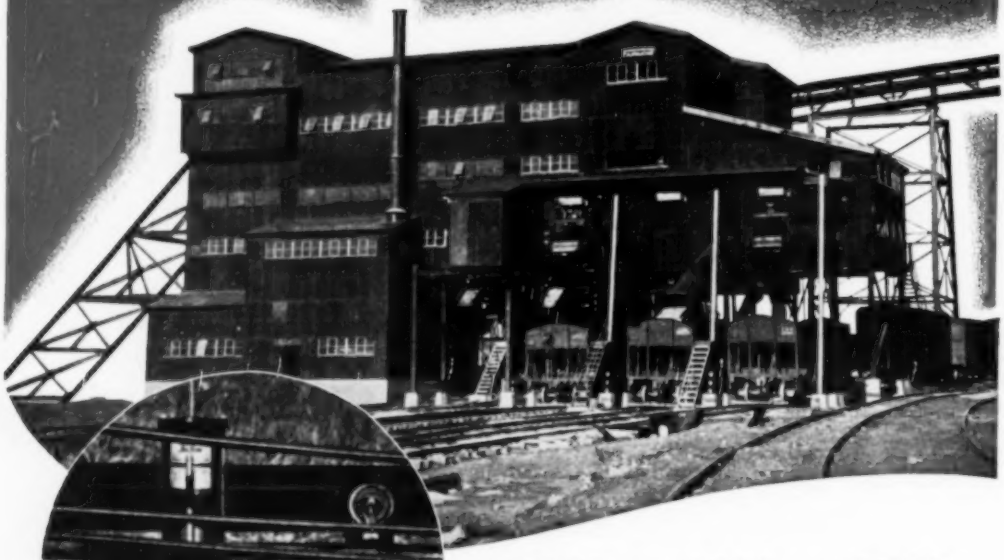

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LOCAL UNIONS VOTE to stay out of pits as . . .

"No Welfare, No Work" Halts Mines

UMWA bituminous and anthracite miners failed to report for work Sept. 19 after welfare-fund trustees voted to stop payments, except for emergency hospital and medical cases, from the near-bankrupt bituminous fund and anthracite-fund trustees announced that payments would be halted Sept. 30. The usual pattern of spreading idleness and loss of wages quickly took shape in other industries, notably coal-carrying railroads, which immediately furloughed some 30,000 workers.

About 63,000,000 tons of bituminous was reported in stockpiles when the miners quit work—enough to last major industries at least a month. Steel mills, faced with a possible strike of their own Oct. 1, were said to have 45 days' supply on hand; electric utilities, as much as 60 days' supply. Stocks on June 30, when Mr. Lewis ordered the work week shortened, were estimated at 74,161,000 tons.

Little picketing or violence was reported as the stoppage spread, the only activity being by a few roving pickets who overturned trucks in West Virginia and fired on a truckdriver in Kentucky. Mostly, the miners simply stayed at home. The stoppage was the third this year, previous ones being the "memorial-period" shutdown in March and the "stabilizing period of inaction" in June.

The full-fledged halt that began Sept. 19 enlarged a part-time strike that had been effective in bituminous mines east of the Mississippi since June 30, when Mr. Lewis ordered his miners on a three-day week to spread the work. Union officials claimed the full-scale walkout, which included sympathetic anthracite miners, was the miners' own idea. They said the workers were angry because welfare-fund benefits had been stopped following the reported failure of some southern operators to remit the installment due Aug. 20.

Mr. Lewis, announcing Sept. 17 the action of the trustees in suspending benefit payments, stated that the fund's surplus had shrunk from $30,000,000 on June 30 to $14,000,000 on Aug. 31. It is generally known that the fund had been overspending its income for several months even before the three-day week cut back production and thus whittled down income. Beneficiaries of the bituminous fund are estimated at some 375,000 miners and dependents.

Operators countered Mr. Lewis' charges that they had provoked the strike by pointing out that his actions in invoking the three-day week had shrunk the fund's reserves and led to the stoppage, that payments to beneficiaries had been too lavish and that he and district officials had signaled the walkout by public expression of their views.

It was doubtful that payment of some $3,000,000 made Sept. 20 by northern operators would enable the bituminous fund to resume benefits or persuade Mr. Lewis to order miners in the northern fields back to work. Northern producers made it clear that their payme Sept. 20 was not a gesture of appeasement but rather the fulfillment of "an implied agreement" following expiration of the old

---

THIS MONTH'S COVER shows one of the new major equipment units designed for cutting coal cost—the cutting end of a continuous miner digging into the face. For a useful guide to the steps management can take in cutting costs, turn to p. 70 of this issue.

Coming in November

Getting Ahead in Coal Mining—The qualities you need to get to the top and how some industry leaders have done it.

How Stainless Steel Improves Screening, results in higher preparation standards, cuts cost.

How Systematized Training Pays Off at Red Jacket Coal Corp. in greater safety and better labor relations.

New Portable Tipple at Glen Mary prepares quality coal from reopened wartime mine.

Hanna Ditching Machine marks loading line, saves 200-400 tons of strip coal per acre.

contract. Anthracite operators are reported to have kept up their welfare-fund payments consistently.

Meanwhile, efforts of three operator groups—the Southern Coal Producers Association, northern and western operators and "captive" representatives—to write a wage agreement with union officials were fruitless and it appeared that little progress would be made until the steel controversy was settled and coal stockpiles were reduced still further. John Owens, UMWA secretary-treasurer, bluntly told the southern group in Bluefield, W. Va., Sept. 20, that the union would not bargain further until past-due payments were made to the welfare fund. At White Sulphur Springs, spokesmen made no comment following a two-hour session Sept. 21 between union representatives and northern and western producers. Wage talks with southern operators have been going on intermittently since May 25; with northern producers, since June 22. On Sept. 22 breakdown of negotiations was again announced. Their resumption was scheduled for one week later and meanwhile all UMWA mines throughout the country remained closed.

Although several other southern operators were reported to have withheld welfare-fund payments due Aug. 20, J. D. Francis, chairman of the board, Island Creek Coal Co. and Pond Creek Pocahontas Co., was Mr. Lewis' principal target in the build-up preceding the mass walkout of miners. In a letter Sept. 12 to Mr. Francis, Mr. Lewis charged that Island Creek and Pond Creek were "in default of payments to the welfare fund on coal mined since July 1." He demanded a telegraphic reply to the question, "Will you or will you not remit?"

Taking up the challenge immediately, Mr. Francis replied that his companies were obligated to pay into the fund only so long as there was a contract and that no contract had existed since June 30. He suggested that Mr. Lewis could correct this situation by "promptly and in good faith negotiating a reasonable collective bargaining agreement with the Southern Coal Producers Association and permitting our employees to go back to work on a normal schedule without restriction of production."

Mr. Lewis' later demand on the Cleveland Trust Co., Cleveland, Ohio, that it force Island Creek to remit payments was met with a blunt refusal by bank officials, who explained that they had no direct control over Island Creek's affairs.

Meanwhile, operators were reported to be casting about for a trustee to succeed Ezra Van Horn, who Sept. 14 submitted his resignation to operator signers of the 1947 and 1948 contracts. Charles I. Dawson, Louisville, Ky., U. S. District Judge from 1924 to 1935 and now counsel for the Harlan Coal Operators Association and several coal companies, was mentioned as a strong possibility. Mr. Van Horn's letter of resignation asked that his successor be named promptly. Later, when suspension of welfare-fund payments was announced, it was revealed that he and Senator Bridges, neutral trustee, had voted to stop payment of their $35,000-a-year salaries temporarily. Senator Bridges, questioned about his announced intention of resigning, explained that he would not resign "until the situation has been ironed out and I feel that the job has been completed. But I still look on my assignment as temporary."

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Mining Classes Start Again in Charleston, W. Va.

Night classes in coal mining were scheduled to begin Sept. 22 in the state capitol building, Charleston, W. Va., according to a recent announcement by officials of the mining extension department, West Virginia University. Instruction is planned in mine gases, safety lamps, ventilation, fires, explosions, gas testing and map work. The courses are designed for men wishing a technical knowledge of coal mining, workers seeking foreman certification and foremen who want to refresh their knowledge.

Coal Companies Report Safety Achievements

Outstanding safety achievements recently reported to the Safety Division, National Coal Association, include those of the Coal Division, Eastern Gas & Fuel Associates; Red Jacket Coal Corp.; Imperial Coal Corp.; and the Blue Diamond Coal Mining Co.

Federal No. 1 mine, Coal Division, E. G. & F. Associates, Grant Town, W. Va., at the end of August had mined 4,341,151 tons of coal since the last fatality, according to C. R. Stahl, assistant to the vice president.

The six mines of the Red Jacket Coal Corp., Red Jacket, W. Va., completed one year's operation in August without a fatality, J. J. Plasky, training and safety director, reported. During the period, the mines employed 2,600 people and mined 2,800,000 tons of coal.

The Imperial Coal Corp. reported that since May 12, 1944, it had produced 3,522,190 tons of coal without a fatality.

As of the first week in August, the Blue Diamond Mine No. 1, Blue Diamond Coal Co., Blue Diamond, Ky., had produced 4,092,210 tons of coal since its last fatality in October, 1944. During that period, totaling 6,192,590 man-hours of exposure, there were 77 injuries which totaled 23,090 hours of losttime. On this basis, the operation had 80,423 man-hours of exposure and produced 53,145 tons of coal per losttime injury.

Arkansas Court Dismisses Welfare Fund Action

Suits brought by the trustees of the UMWA Welfare and Retirment Fund against Jackson & Squires, Inc., F. S. Neely, Inc., and the Midwest Mining Co., for royalties allegedly due under wage agreements of the last two years, were dismissed Sept. 16 by Federal Judge John E. Miller, Ft. Smith, Ark.

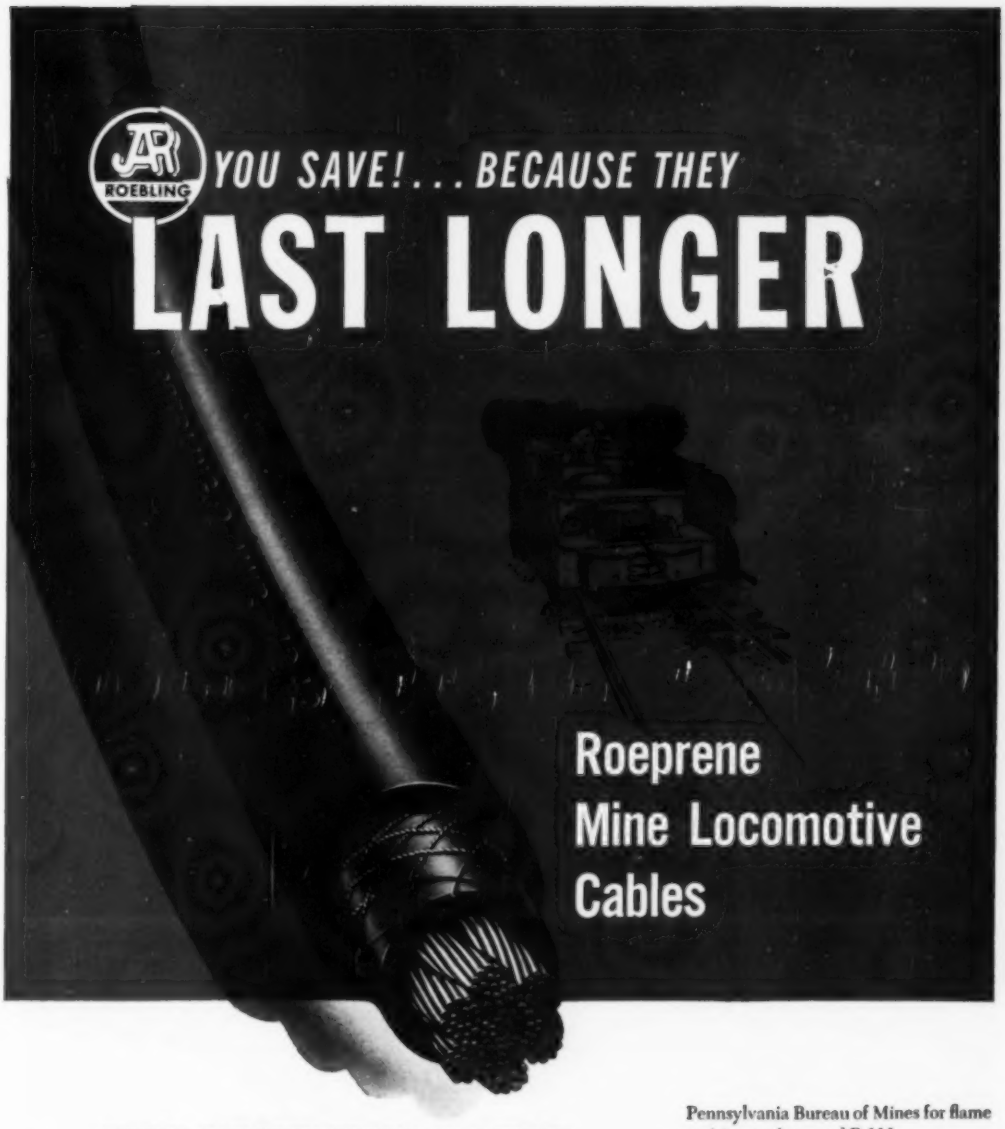
The court ruled that the trustees cannot sue to collect money reportedly due under the wage agreement unless the contract between the union and the operators is valid in the state where the payments are to be made. The contract was held to be invalid under Arkansas law because of the union-shop provision.

In February, 1947, Arkansas adopted a "freedom to work" constitutional amendment, which provides that "no person shall be denied employment because of failure or refusal to join or affiliate with a labor union," that no person shall enter into any contract to exclude from employment persons who fail or refuse to join a labor union, and that any person entering into such a contract shall be guilty of a misdemeanor.

British Coal Mines Show 1949 Six-Months Profit

The National Coal Board reported Sept. 13 that the nationalized British coal mines showed an operating profit of £6,300,000 in the second quarter of 1949, as compared with profit of £7,200,000 in the first quarter. After providing for interest and taxes, the Board's surplus was £3,800,000 in the first quarter and £2,400,000 for the second.

In 1948, the second year of nationalization, the British mines showed a profit of £1,700,000, compared with a loss of £23,250,000 in 1947. However, at the time that the 1948 report was released (*Coal Age*, July, 1949, p 116), it was indicated that the operations had been put in the black only through increasing coal prices to consumers and it was said that the 1948 mining cost was $9 a ton, compared with $3 in 1938.



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ROEBLING

☆ *A CENTURY OF CONFIDENCE* ☆

Ray Bucklew (seated, left), asst. mine foreman; E. E. Fullmer, section foreman; A. E. Spotti, asst. supt.; Joe Barillo (standing, left), Joe Drosky and Ray Zannier, section foremen; C. L. Burnside, general mine foreman; Loy Kyle and Jack Williamson, section foremen; and George Brooks, dispatcher, Arkwright Mine, Christopher Coal Co.

C. O. Kane, gen. supt., Mining Division, Armco Steel Corp., Montcoal, W. Va.

COAL MEN

Charles Swope (left), general outside foreman, Arkwright mine; Morris Specht, Syntron Co.; and Frank H. Brooks Sr., superintendent, Arkwright mine, Christopher Coal Co., Morgantown, W. Va.

George Ward (left), secretary, Harlan Coal Operators' Assn.; W. E. E. Koepler, secretary, Pocahontas Coal Operators' Assn.; and H. S. Homan, secretary, Big Sandy-Elkhorn Coal Operators' Assn.

D. E. Lovan (left), electrician, and Fred Bryson, shop foreman, Sooner Coal Mining Co., Oologah, Okla.

Max Miller (left), tipple foreman, and Bill Bellamy, billing clerk, Broken Arc Coal Mining Co., Okmulgee, Okla.

Samuel F. Carter, supt. of maintenance, Mining Division Armco Steel Corp.

J. O. Westlund (standing, left), office manager; J. A. Caldwell, billing clerk; Dale Massie, top foreman; J. M. Bishop (seated, left), chemist; J. M. McCoy, chief engineer; L. S. Edie, superintendent; B. H. Rees, plant foreman; and George Frazer, assistant superintendent, Ceredo preparation plant, Truax-Traer Coal Co., Ceredo, W. Va.

ON THE JOB

L. R. Moore (left), safety director; S. G. Houck, general mine foreman, night shift; and Ralph Halsey, general mine foreman, Brule Smokeless Coal Co., Otsego, W. Va.

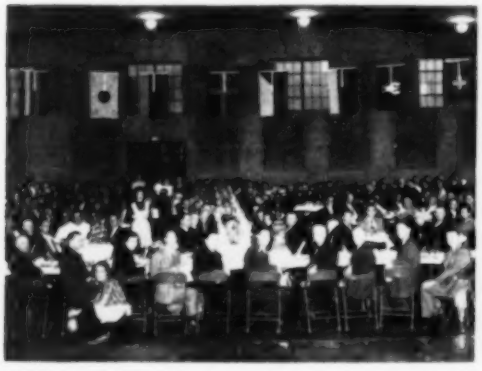
W. W. Chambers (left), top tipple foreman; C. G. Hall, day tipple foreman; and Ewing Chambers, night tipple foreman, Green Valley mine, Snow Hill Coal Corp., Terre Haute, Ind.

D. W. French (left), payroll clerk; and F. R. Dow, vice president, Home Creek Smokeless Coal Co., Home Creek, Va.

Harry Bushong (left), storekeeper, and R. F. Rushing, top foreman, Lake Creek mine, Consolidated Coal Co., Johnson City, Ill.

Reliance No. 7 Mine Presented With 1948 Sentinels of Safety Trophy as . . .

PERSONNEL OF RELIANCE NO. 7 MINE, winners of the 1948 National Safety Competition, who worked 383,888 man-hours without accident.



PARTIAL VIEW (left) of the banquet held by the company to honor Reliance No. 7 mine. During presentation of individual Certificates of Achievement (right), I. N. Bayless (left), U.P. president, Leon Wisniewski, Local 905, UMWA, William Spence, Reliance superintendent, Theodore Marvin (seated), Hercules Powder Co., and H. C. Livingston, vice president, operations, who acted as toastmaster.

U.P. Coal Gets Tenth Industry Award

THE 225 MINERS AND OFFICIALS of Reliance No. 7 mine, The Union Pacific Coal Co., winners of the 1948 Sentinels of Safety Award were honored Sept. 23 for their outstanding safety record at a banquet tendered them by the company at the Old Timers' Bldg., Rock Springs, Wyo. Presentation of the Sentinels of Safety Trophy by Dr. James Boyd, director of the U. S. Bureau of Mines, to I. N. Bayless, president of the company, marked the tenth time that operations of The Union Pacific Coal Co. had won the National Safety Competition since its inauguration in 1925.

In topping the 1948 bituminous-coal mine competition, in which 156 mines participated, Reliance No. 7 worked for the entire year of 1948 without a single lost-time accident, a total of 383,888 man-hours. Its perfect safety record also has been continued through the first eight months of 1949—the operation having worked a total of 246,280 man-hours without an accident through Aug. 31. For the entire period of 20 months, the mine has worked 638,168 man-hours without a lost-time injury. While this was the first trophy won by Reliance No. 7, during the previous 12 years, it was pointed out, the mine worked 5½ million man-hours and had a total of only 72 lost-time accidents.

H. C. Livingston, vice president, operations, acted as toastmaster and in opening the ceremonies introduced the large group of invited guests, who included state and federal bureau officials, district and local UMWA officials, other coal-company heads, community leaders and others. Theodore Marvin, director of the Hercules Powder Co.'s *Explosives Engineer*, which makes available the bronze Sentinels of Safety Trophies to winners of the competition sponsored by the U. S. Bureau of Mines, was the first speaker of the evening. Mr. Marvin outlined the history of the competition and pointed out that Reliance No. 7 had reached the peak in mine-safety history, proving that accidents could be controlled. The green and white Sentinels of Safety flag which will be flown over the mine also was presented by Mr. Marvin.

In complimenting the mine on its "remarkable record," Dr. Boyd said that when the Bureau was first organized its job was to reduce accidents and that now it was seeking to eliminate them entirely—a goal that had been demonstrated to be possible by the achievements of Reliance No. 7. He pointed to the encouragement this record offered to the thousands of men throughout the industry who are striving for greater coal-mine safety.

Mr. Bayless expressed his sincere pleasure in accepting the Trophy on behalf of the men and officials of Reliance No. 7, stating that they "actually made the record and are entitled to all the credit." Mr. Bayless asked all present to carry safety on into the

(*Continued on p.* 160.)

P&H *added safety* **means** *added production*

ALONG THE IRON RANGE!

Here are just a few of the Added Values that change down-time and delays into actual digging time . . . added production.

"Run away" Dangers eliminated — independent propel keeps crawler geared to propel power at all times.

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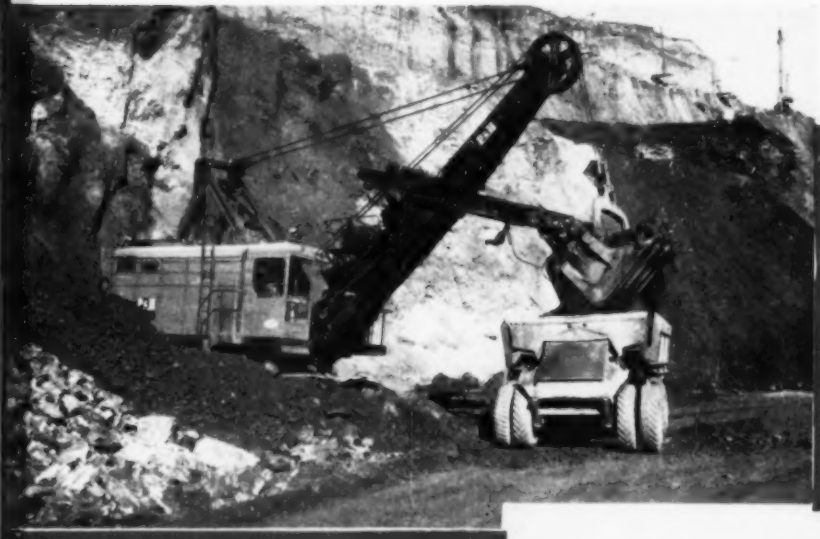
These and other important Added Values explain why users along the Iron Range are reordering P&H Electric Shovels.



Two of these P&H Model 1600 (16 cubic yd., shovels) have taken over heavy production assignments along the Mesabi.

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Personal Notes

James W. Morgan has been named vice president and general manager, Ayrshire Collieries Corp., Indianapolis, succeeding **J. B. F. Melville**, who retired Sept. 1 after 24 years of service with Ayrshire and one of its predecessor companies. Mr. Melville will continue as a director of the Ayrshire group. Mr. Morgan joined C. A. Hughes & Co. as a mining engineer on his graduation from Lehigh University in 1921. He became vice president and treasurer of the company in 1932, continuing in that post until 1948, when he became assistant to the vice president in charge of operations of Truax-Traer's eastern mines.

The retirement of **J. A. Saxe**, director of engineering, Island Creek Coal Co., Pond Creek Pocahontas Co. and Marianna Smokeless Coal Co., in accordance with the company's retirement annuity plan, has been announced by James L. Hamilton, vice president in charge of operations. Mr. Saxe, who became director of engineering in July, 1940, formerly was chief engineer for the Industrial Collieries Co., Ellsworth, Pa. **F. C. Menk**, associated with Island Creek and affiliated companies since 1936, has been named to succeed Mr. Saxe as director of engineering, effective Oct. 1.

The appointment of **George McCaa** as general superintendent of all mines in the Fairmont division, Consolidation Coal Co. (W. Va.), has been announced by G. R. Higinbotham, vice president - operations. **Harold B. Wickey**, formerly general superintendent, Mines Nos. 38, 93, 97 and Everettville, has been named assistant to the vice president-operations, in charge of engineering. **K. K. Kincell**, superintendent, Mine No. 63, Monongah, has been made assistant general superintendent, in direct charge of Mines Nos. 38, 93, 97 and Everettville. **L. H. Riggs**, superintendent, Mine No. 38, has been transferred to superintendent, Mine No. 63. He has been succeeded as superintendent at Mine No. 38 by **R. W. Davidson**, formerly section foreman, Mine No. 63. **Clifford Moon** has been promoted from inside day work to section foreman, Mine No. 38.

Five changes in operating personnel were announced early last month by the Lehigh Valley Coal Co., Wilkes-Barre, Pa. **Hayden Owens** was named to the newly created post of assistant to K. F. Arbogast, general manager, and will be active in the Hazleton area. **Thomas C. Price**, superintendent, Hazleton Shaft colliery and associated with the company for the past 32 years, became superintendent, Prospect colliery. He was succeeded as superintendent at Hazleton Shaft by **Barton Gundry**, advanced from assistant superintendent. **H. C. Griesing**, superintendent, Prospect colliery, was transferred to superintendent, Westmoreland colliery. **J. H. Haertter**, superintendent at Westmoreland Colliery, was assigned to special duties for the company.

ARNO C. FIELDNER, chief, Fuels and Explosives Division, U. S. Bureau of Mines, was honored Aug. 30 with the Distinguished Service Award and Gold Medal by the U. S. Department of the Interior, in recognition of his notable contributions to fuel technology and of more than 40 years of exemplary public service.

John Peperakis, formerly mine engineer, has been named assistant manager, Sunnyside mine, Kaiser Co., Inc., Sunnyside, Utah. **T. R. McCourt**, acting mine superintendent, has been appointed mine superintendent.

The appointment of **D. H. Davis** as division superintendent, Mathies Division, Pittsburgh Coal Co., Libray, Pa., succeeding **J. T. Clark**, who retired Aug. 31, has been announced by Henry Rose, vice president in charge of operations. Mr. Davis formerly was assistant to Mr. Clark. **Jake Eichler**, mine foreman, Warden mine, since 1942, retired July 31 after 50 years of service with the company, most of which was spent at the Warden mine.

The retirement May 1 of **P. C. Morris**, vice president in charge of operations, has been announced by the New York Coal Co., Nelsonville, Ohio. **P. L. Allen**, formerly chief engineer, was named general manager of the company and, at the same time, **R. C. Hickman** was appointed chief engineer to succeed Mr. Allen. **Willis Wolfe**, assistant purchasing agent, was made purchasing agent July 1, succeeding **P. B. Verity**, retired.

Jay T. Littlepage, formerly section foreman, has been appointed superintendent, Camel Run mine, Warner Collieries Co. **William A. Lee**, maintenance inspector at the company's Jensie mine, has been appointed superintendent at that operation. **Fred Balbinot** and **Robert D. Fuller**, previously section foremen, Dun Glen mine, Hanna Coal Co., have joined the Camel Run mine as section foremen.

Luther S. Safriet, who recently retired as general manager, Gatliff Coal Co., Gatliff, Ky., was honored in August at a luncheon given by the wives of officials and employees of the company and attended by officials of the company, state and federal bureaus and others. Mr. Safriet has been active in the industry as an employee and official for the past 48 years without a lost-time injury. At the luncheon, tributes to Mr. Safriet's personal safety record were made by J. B. Gatliff Sr., president, and J. B. Gatliff Jr., vice president, Gatliff Coal Co.; Noah L. Jackson, senior inspector, Kentucky Department of Mines and Minerals; Ira Inman, safety director, Cumberland Valley Mining Institute; Marshall Reeves, mine superintendent, and other former associates. The Joseph A. Holmes Certificate of Honor was presented to Mr. Safriet by C. H. Dodge, engineer-in-charge, U. S. Bureau of Mines, Jellico, Tenn.

Several changes of personnel at the McDowell County, West Virginia, operations of the Olga Coal Co., have been announced by H. E. Mauck, general superintendent. **William A. Laird**, formerly mine foreman, Olga No. 1 mine, has been named superintendent of that mine. **Homer Hickman**, production foreman, has succeeded him as mine foreman. At Olga No. 2 mine, **P. D. Turner** mine foreman, has been appointed superintendent. **D. C. Horton**, formerly production foreman, has been advanced to mine foreman to succeed Mr. Turner. **H. M. Turner**, formerly mine foreman, Caretta No. 5 mine, has been made superintendent-mine foreman at that operation. **Jack W. Rose**, gas inspector, Olga No. 1 mine, has been appointed mine inspector at Olga No. 2, and **J. H. Parrott**, formerly section foreman, Olga No. 2, has been made mine inspector at Olga No. 1.

W. R. Park, associated with the Norton, Va., station of the U. S. Bureau of Mines, has been named to head a new substation at Barboursville, Ky. **Clarence Hyde** also has been transferred from Norton to the new station, along with three members of the Bureau's staff at Jellico, Tenn.

A. G. Gossard, general superintendent, New Kathleen mine, Union Colliery Co., DuQuoin, Ill., has been named general superintendent for the company, and, in addition, will supervise the Poplar Ridge mine, Sturgis, Ky., acquired by Union Colliery from the North American Co., effective Sept. 1. Mr. Gossard, who became superintendent of the New Kathleen mine Sept. 1, 1947, was previously mine superintendent for the Pittsburgh Coal Co. **George Higgins Jr.** has been appointed superintendent at

NEW

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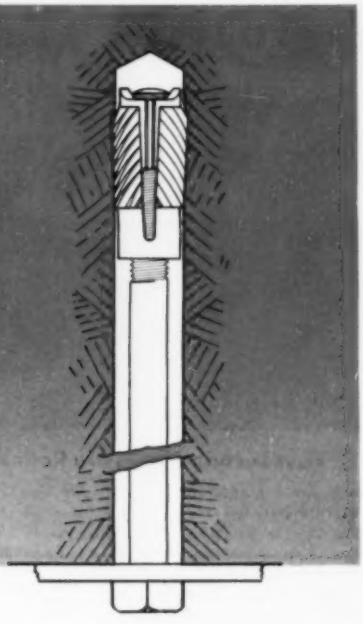

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First Lorado Employee Retires Under Pension Plan

WILLIAM P. MARSHALL (right), assistant store manager, Lorado Stores System, receives his initial check from Harry C. Walter, personnel manager, Lorain Coal & Dock Co., Columbus, Ohio, as the first employee of the mining operations to retire under the company's pension plan which went into full effect last April. Mr. Marshall, who, at the age of 55, had served 22 years with the company, all in the stores division, chose to retire under the part of the plan permitting employees with 20 years or more service to retire at the age of 55. Those employees who have 30 years of service may retire at any age under the plan. Mr. Marshall plans to make his home on a farm near Frametown, Braxton County, W. Va.

New Kathleen, to succeed Mr. Gossard. Other appointments at the operation include **Floyd Morefield**, mine manager; **Joseph Beggs**, second-shift mine manager; and **Harley Jones**, section foreman.

John H. Berry, fireboss of the Dixie No. 2 mine, Paris, Ark., for the past five years, has been named Arkansas state mine safety director. Mr. Berry has been a miner for the past 24 years, the last 13 as a fireboss.

Ed Grezlak, recently appointed assistant superintendent, has been named superintendent of the Benton, Ill., mine rescue station, succeeding **Walter Anderson Sr.**, superintendent since 1941. Before joining the station, Mr. Grezlak was with the Zeigler No. 2 mine for 13 years.

M. K. Reed, Martin, Ky., and **Clyde B. Owens**, Gray's Knob, Ky., have been named Kentucky state mine inspectors for four-year terms.

W. E. Perry has been named mining engineer, Superior Anthracite Mines, Inc., McCoy, Va.

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Obituaries

Edward M. Gatliff, vice president of the Gatliff Coal Co. and the High Splint Coal Co., died Sept. 13 at his home in Williamsburg, Ky., following a heart attack. Mr. Gatliff, who was about 60, also was active in politics and was a member of the Democratic State Central Committee for 14 years. He served as assistant U. S. district attorney for the Eastern Kentucky district from 1917 to 1921 and was highway commissioner for the state's ninth district in 1932.

Cleard Smith, 42, inside day foreman, at the Mogg, Ky., mine of the Norton Coal Corp., was killed Sept. 14 when he was pinned against the rib by a loading machine.

•

Association Activities

Greenbrier Coal Operators' Association has elected the following officers: president, W. E. Sellards, president, Left Fork Fuel Co., Quinwood, W. Va.; vice president, C. E. Hough, vice president, Imperial Coal Co., Quinwood, W. Va.; and secretary-treasurer, Harold W. Yates, Rainelle, W. Va.

Illinois Coal Operators' Association has elected T. G. Gerow, executive vice president, Trunx-Traer Coal Co., president, succeeding the late George F. Campbell.

Controller Institute of America has reported the election of Howard E. Lohmann, treasurer, Ayrshire Collieries Corp., as president of the Indianapolis Control. Lee G. Lowe, controller and assistant secretary-treasurer, DeBardeleben Coal Corp., has been elected vice president of the Institute's Birmingham Control. John L. Auch, vice president, Pittsburgh Consolidation Coal Co., has been named a director of the Pittsburgh Control and James E. Hirleman, assistant treasurer and assistant controller, Pittsburgh Coke & Chemical Co., has been re-elected secretary.

•

New Developments

•Semet-Solvay Division, Allied Chemical & Dye Corp., Bluefield, W. Va., has reported plans for opening two new operations and the anticipated closing of two of its present mines. The company's Exeter and Warwick mines reportedly are nearing exhaustion and will be closed before Jan. 1. At Tralee, W. Va., the company this fall will open its new Tralee mine, a drift operation mining the No. 3 Pocahontas seam 44 in thick. A daily capacity of 4,000 tons is being planned and shipments will be made on the Virginian Ry. Preparation facilities will include screens, Chance washer, loading booms and oil treatment. Its Marytown mine, located at Marytown, W. Va., will be opened later and will have a daily capacity of 1,000 tons. Also a drift operation, it will mine the 36-in Sewell-Welch seam and ship from Davey, W. Va., on the N. & W. Preparation will include screens, jig Washer, loading booms and oil treatment.

•Leasing of 5,467 acres of coal land in McDowell County, West Virginia, by the Southern Coal Corp., Bluefield, has been announced. The property, which is being leased from the Pocahontas Land Corp., contains the 46-in Bradshaw seam and adjoins a 1,133-acre tract already leased by the company from the Pocahontas Land Corp. The Southern Coal Corp. plans to erect a new tipple and cleaning plant with a daily production of 3,500 tons, it is understood. Present output is about 1,300 tons daily.

•The Bell & Zoller Coal & Mining Co. late in August officially opened its new Oriole mine near Madisonville, Ky. The new property, which will mine the No. 11 seam, includes a new McNally Pittsburgh washery having a capacity of 500 tph. The company is expected to open its new Moss Hill mine, located near the Oriole, within the next six months. That operation will have a capacity of 3,000 tons of No. 9 coal per day.

•Opening of the new mine of the Puncheon Creek Coal Co. in Knott County, Kentucky, was announced last month. John E. Bowman, president, and R. A. Hedland, general manager, Utilities Elkhorn Coal Co., Pikeville, hold the same titles in the new company and are its principal stockhold-

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"FS" Flat Swivel for use with wooden pieces. (On jack at left).

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SIMPLEX PIN-UP JACKS

Type "FL" Head flat with lugs.

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Page one news for mine operators—every day in the year—is improved mine safety . . . the story that *doesn't* hit the headlines. Mine safety starts with Simplex Mine Roof Jacks for safer, more efficient roof control. Here is jacking safety that gives improved operating dependability; longer service and lower jacking costs. Simplex jack engineering offers you a complete line of better, safer jacks for every mine job:

SIMPLEX MINE ROOF JACKS
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Double lever sockets, 5-ton capacities, for coal cutting and loading machines, rerailing cars, shop, track work.

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MEETINGS

- National Safety Council: Coal Mining Section, 37th National Safety Congress and Exposition, Oct. 24-26, Stevens Hotel, Chicago.
- Coal Division, AIME, and Fuels Division, ASME: Joint meeting, Oct. 26-27, French Lick Springs Hotel, French Lick, Ind.
- Illinois Mining Institute: 57th annual meeting, Oct. 28, Hotel Abraham Lincoln, Springfield, Ill.
- West Virginia Coal Mining Institute and Central Appalachian Section, AIME: joint meeting, Nov. 11-12, Summit Hotel, Uniontown, Pa.

ers. The new mine, which is completely mechanized, using Joy loaders and drop-bottom mine cars, will have a capacity of 600 to 700 tons daily from the No. 3 Elkhorn seam 100 in thick. The upper bench of the seam measuring 72 in. which is entirely free of impurities, is now being mined on the advance and the remaining 28 in will be removed later if conditions permit. Coal is conveyed from the headhouse located high on the mountain across the valley to the tipple via an 800-ft aerial tramway. Coal is sized at the tipple and shipped via the C. & O.'s new extension. The operation, which has a life of 10 years, will use roof-suspension bolts and will top-cut the coal. W. M. Picklesimer, Pikeville, is superintendent.

•Partch Bros., Gunnison, Colo., has purchased the Alpine Fuel Co. mine and also has leased from the Rocky Mountain Coal Co. the New Baldwin (Kubler) workings of the Alpine Fuel Co. Exploration work to develop new workings and modernization of the property are being planned.

•The newly formed Poplar Ridge Coal Co., a subsidiary of the Union Electric Co., Sept. 1 took over operation of the Poplar Ridge mines of the West Kentucky Coal Co., near Sturgis, Ky., in accordance with a 1942 order of the Securities and Exchange Commission directing the North American Co. to divest itself of non-related holdings. Operation of the property is to continue on the same basis without major changes in personnel. A. G. Gossard, superintendent of Union Colliery Co.'s New Kathleen mine has been named general superintendent in charge of both properties.

•Coal shipments were begun Sept. 11 from the old Apex Coal Co. property near Thornton, Ky., by the newly organized Apex-Elkhorn Coal Co. The new mine is a truck operation and will load 600 to 800 tons a day. Incorporators of the new firm include S. J. Caudill, T. F. Brooks and others.

•The Jake Adkins Coal Co. coal-loading ramps at Kona, Ky., on the main line of the L. & N., resumed opera-

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THE Jeffrey Manufacturing Company insures dependable, trouble-free shuttle car operation by mounting axle and wheel assemblies and conveyor drive speed reducer on Timken® tapered roller bearings.

Timken bearings hold wheels, shafts, and gears in proper alignment—prevent excessive wear on moving parts. They practically eliminate out-of-service time for bearing lubrication and maintenance.

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No other bearing can give you *all* the advantages you get with Timken tapered roller bearings. Be sure you have them in your mining equipment wherever the loads are tough. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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JEFFREY SHUTTLE CARS
are equipped with 24 Timken roller bearings in the axle and wheel assemblies and in the conveyor drive speed reducer.

POSITIVE ROLLER ALIGNMENT

Wide area contact between roll ends and rib of the cone prevent Timken roller bearings from skewing. Result: bearings roll easier, last longer.

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Kennametal U-5-H's Make

86% Reduction in Bit Cost

AT STERLING COAL COMPANY, MINE NO. 6, BAKERTOWN, PA.

TOP CUTTING

A set of 42 Kennametal U-5-H Bits, on this Jeffrey 29C, cuts 1300 20' places, 8' deep in 3' coal.

Cost Reductions Made With Kennametal U-5-H Bits, as Reported by T. J. Lamont, Mine Superintendent

	Conventional	Kennametal
Tonnage/Set of 42 Bits	133	24,700
Number of Bits Needed to Cut 24,700 Tons (1300 places)	7,800	42
Bit Cost for 24,700 Tons	$347.00	$50.40
Bit Cost per Ton	$ .0140	$.0020
	Bit Cost Reduced 86%	
Bit Changes (1300 places)	186	2
	Bit Changing Reduced 98.9%	

T. J. Lamont, Superintendent of the mine, says, "Kennametal Bits give us far better service—reducing bit cost per ton by 86%. A set of 42 bits cuts 24,700 tons of coal at a bit cost of .2 of one cent per ton."

Equally important, in terms of savings, is the fact that Kennametal Bits require less changing. As Mr. Lamont points out, "Bit changing has been reduced 98.9% since Kennametal Bits have been on the job."

At the Sterling mine, the life of Kennametal Bits is 186 times that of conventional bits. 500 places are cut with Kennametal Bits before resharpening—in cutting 24,700 tons, only two resharpenings were needed.

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EQUIPMENT APPROVALS

Eight approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, 1949, as follows:

Joy Mfg. Co.—Type U-3273KK boom car loader; one motor, 4 hp, 550 v ac; Approval No. 2-678A; Aug. 9.

Goodman Mfg. Co.—Type 312EL3 shortwall mining machine; one motor, 50 hp, 500 v ac; Approval No. 2-679A; Aug. 9.

Lee-Norse Co.—Model TJ1P-1J utility truck; one motor, 3 hp, 90 v dc; Approval No. 2-680; Aug. 23.

Joy Mfg. Co.—Type U-725-4E/F face conveyor; one motor, 5 hp, 250 and 500 v dc; Approvals Nos. 2-681 and 2-681A; Aug. 25.

Joy Mfg. Co.—Type U-737-4E/F elevating conveyor; one motor, 5 hp, 250 and 500 v dc; Approvals Nos. 2-682 and 2-682A; Aug. 25.

Joy Mfg. Co.—Type U-742-7AE/F shaker conveyor; one motor, 10 hp, 250 and 500 v dc; Approvals Nos. 2683 and 2-683A; Aug. 25.

Joy Mfg. Co.—Type B-312-SPX-1164A scraper loaders; one motor, 20 hp, 250 and 500 v dc; Approvals Nos. 2-684 and 2-684A; Aug. 29.

U. S. Electric Mfg. Corp.—Models XP-22 and XP-32 flashlights; Approval No. 615; Aug. 31.

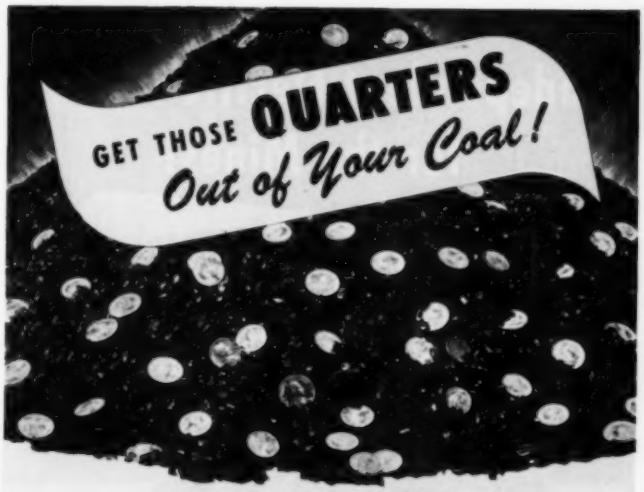
tion last month after a long shutdown. The ramps ship coal from six nearby truck mines as well as from the Adkins mines. Two ramps near Whitesburg, Ky., owned by the Sandlick Coal Co. also began shipments last month after being closed for almost a year.

•The N. J. Lucas Coal Co., Whitesburg, Ky., recently organized by N. J. Lucas and others, has begun the development of two new truck mines on Breedings Creek and will truck the output of 600 to 700 tons daily to a loading ramp at Sassafras, Ky., on Carr's Fork branch of the L. & N.

•H. C. Simms-Houck Reidler Bros. Coal Mining Co., Tunnelton, W. Va., has opened its new Louise No. 2 strip mine at West End, W. Va. The operation will mine the Upper Freeport seam, with a capacity of 750 tons daily and will load over a tipple on the B. & O. Preparation equipment includes washery and crushers, with screens planned for installation later.

•Slussar Coal Co., Clarksburg, W. Va., officially opened its Davisson Run mine Sept. 1. William Slussar is president and J. W. Cork, secretary-treasurer.

•The North Breese mine of the Clinton County Mining Co., Inc., Breese, Ill., has been sold to the Breese Coal Co., Breese, Ill.



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We can supply you with Osmose-treated square-sawed, slabbed or round timbers, ties, collars, posts, lagging, caps, wedges or tipple timbers from one of our treating plants. These select OSMOSE-treated timbers will render many years of EXTRA service.

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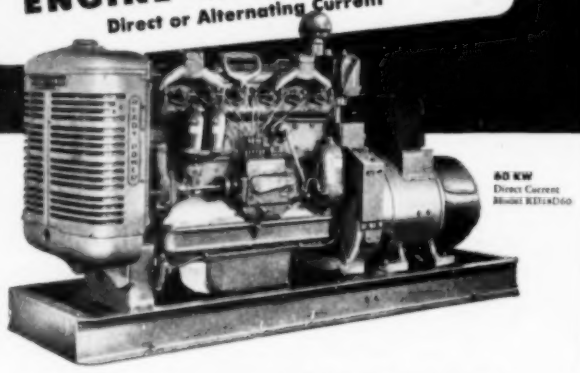

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Operators Upheld in W. Va. Fireboss Dispute

Judge Julian F. Bouchelle, Charleston, W. Va., ruled against the West Virginia Department of Mines' regulation that section foremen could not perform the duties of fireboss, following argument in the Kanawha County circut court Aug. 31. The ruling, which is being actively contested by a group of about 60 coal operators, resulted in strikes in various parts of the state last January, which ended only after a state supreme court injunction secured by the operators directed the circuit court to pass on the question (*Coal Age*, March, 1949, p 140). The state reportedly is expected to ask the supreme court to review the decision.

In their argument, the coal companies contended in part: "The intent of the law is that some person duly qualified shall make such inspections and reports at specified times and places. The section foreman involved herein are qualified as firebosses by express certification of the state. The law is not concerned with who makes the inspections but with the necessity that inspections be made by qualified personnel."

In seeking a complete separation of the two functions, the state's attorney general's office said: "It would only seem reasonable to presume that, in view of the legislative solicitude for the safety of the men who labor in the mines, the legislature, in making special provision for two safety officers or positions, contemplated that they should be different persons."

Continuing, the state maintained: "It would seem only human for the mine foreman, while acting in the capacity of mine foreman and fireboss, to fail to report any dangerous situation he might find as a fireboss which was due to his negligence or oversight while acting in the capacity of mine foreman, because to do so might emperil his employment with his principal, the miner owner."

•

Union Pacific Award

(Continued from p. 150.)

home and on the highway and emphasized the company's realization of the importance of safety and its desire to operate only safe mines. He presented the individual Certificates of Achievement in Safety to William Spence, Reliance superintendent, representing the officials, and to Leon Wisniewski, financial secretary, Local 905, UMWA, for the men. Malcolm Condie, District 22, UMWA, also offered his congratulations to the Reliance personnel.

During the evening, a Certificate of Achievement in Safety also was presented to Union Pacific's No. 11 Mine, which was runner-up in the 1948 competition, with a total of 196,975 manhours without a lost-time accident.

OVERGROUND OR UNDERGROUND, GENERALS ARE BUILT TO LAST LONGER, WORK BETTER, FASTER, *at Lower Cost*

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You can depend on the tough, Top-Quality *General L. C. M.* to give long service under punishing treatment on razor-sharp mineral surfaces. The *General L. C. M.* is designed for trucks that must work 80% in the stripping area and 20% over-the-highway. Thick lugs form a self-cleaning traction tread. Tremendous shoulders prevent cutting, bruising, chafing and chipping. On the highway the L. C. M. rolls smoothly, steers easier.

General's new underground mining tire with extra wide, extra deep tread and tremendously thick, reinforced sidewalls give extra protection against snags, cuts and bruises—many extra hours of wear.

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TRUCK TIRE

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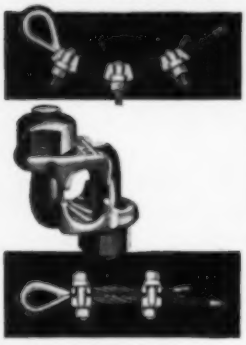

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ALL THESE SAVINGS:

- Fewer clips required . . . money saved
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- Fewer rope breaks . . . accidents saved
- Easy to put on . . . time saved
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Grip your rope with a FIST OF STEEL!

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Pennsylvania Contests Draw 56 Teams as . . .

Pittsburgh Coal Aid Team Wins Pennsylvania State Meet

The first aid team of Mine No. 123, Pittsburgh Coal Co., Gray, Pa., in competition with 35 teams representing the bituminous mining industry of Pennsylvania, won top honors in the Seventh Annual Statewide Bituminous First-Aid Contest at Ebensburg Sept. 10. The winning team achieved a percentage score of 99.867 to take first place and the trophy presented by the Mine Safety Appliances Co. Each member of the team received a cash prize, plus an approved flashlight and a sterling silver ring presented by the contest committee, Pennsylvania Department of Mines, and the National Coal Association, respectively.

Second place in the contest was won by the team representing Watson mine, Westmoreland Mining Co., under Captain Francis Maruschak. The National Coal Association trophy and a cash prize were won by this team.

The team of Indianola mine, Republic Steel Corp., led by Captain Vince Stanec, placed third.

Members of the winning team shown above are: Phillip D'Arrigo (sitting, left), Earl Kimmel, captain, and Robert Harvey; Luther Fisher (standing, left), Steve Waslczak, Alexander Harvey, and Robert Kimmel.

During the course of the contest, the assembly heard addresses by C. J. Potter, president, Rochester & Pittsburgh Coal Co.; James Mark, president, District 2, UMWA; C. A. Owen, president, National Coal Association; James A. Boyd, director, U. S. Bureau of Mines; and W. Garfield Thomas, deputy secretary, Pennsylvania Department of Mines.

Dennis J. Keenan, state mine inspector, was director of the contest.

Glen Alden Team Tops Anthracite First-Aid Contest

Competing in a field of 21 leaders in the region, the Northern Division team of the Glen Alden Coal Co. took top honors in the Pennsylvania Anthracite Fifth Annual Safety Day and First-Aid Contest held at the King-

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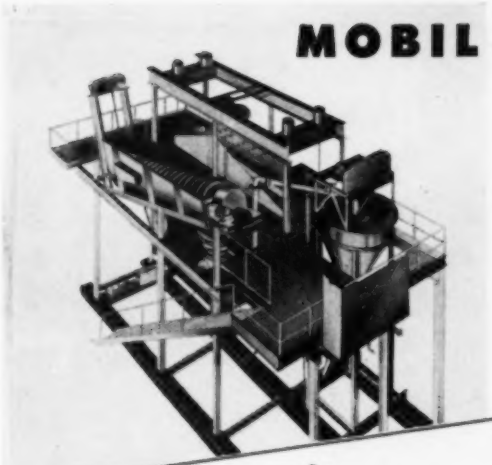
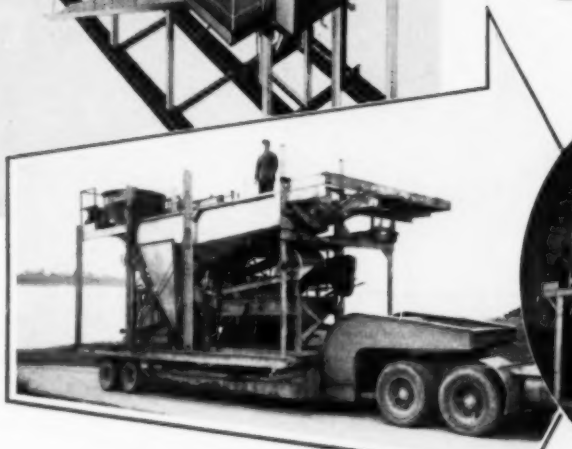
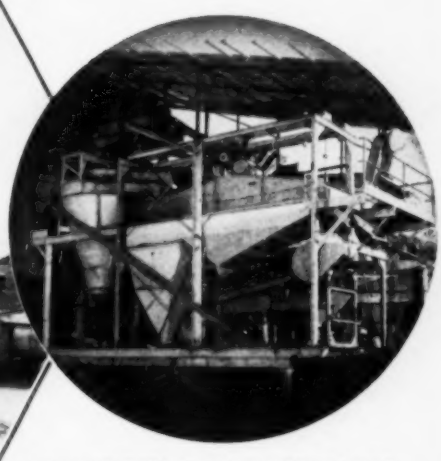
READY TO OPERATE IN 7 DAYS!







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- Compact, semi-portable, easy to operate.
- Sharp separations for clean coal production.

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1. Floor Mounted. You save costly installation charges for suspension equipment when you use the Robins floor-mounted Vibrex Screen.

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In addition, you get all these proved features: Welded construction . . . two-bearing design . . . circle throw . . . adjustable stroke. And the screen is always in perfect balance.

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Coal and Business Activity

	Net Tons	1949 to This Date	1949 Over 1948, to Date
Est. anthracite prod., week ending Sept. 10	788,000	29,246,000	—26.3%
Est. bituminous prod., week ending Sept. 10	5,825,000	326,983,000	—19.8%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, Net Tons)				Consumption (Thousands, Net Tons)		
	Aug. 1, 1949	Days' Supply	July 1, 1949	Aug. 1, 1948	July, 1949	June, 1949	July, 1948
Electric power utilities	25,062	126	25,607	18,551	6,188	6,338	7,701
By-product coke ovens	13,096	61	15,747	8,975	7,008	7,523	8,233
Beehive coke ovens	†	†	†	†	68	417	694
Steel and rolling mills	1,214	75	1,376	1,134	505	559	663
Cement mills	1,469	72	1,614	1,364	629	633	721
Other industrials	16,089	90	17,189	17,579	5,514	6,147	7,155
Railroads (Class I)	8,659	54	9,818	8,368	4,974	5,274	7,408
Retail dealers	2,720	21	2,810	2,148	4,042‡	5,717‡	5,170‡
Total	69,119	74	74,161	58,139	28,908	32,608	37,745

Source: U. S. Bureau of Mines. †Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, wk. ending Sept. 17	185.0	183.2	193.3
Steel ingot operations (% of capacity)	86.2	84.8	96.1
Electric power output (million kw-hr)	5,579	5,579	5,426
Crude oil production (daily avg., 1,000 bbl)	4,845	4,723	5,294
Misc. & L.C.L. carloadings (daily avg., 1,000 cars)	75	71	84
All other carloadings (daily avg., 1,000 cars)	50	51	63
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)	348.1	338.9	420.7
Prices, industrial raw materials (BLS, Aug., 1939 = 100)	230.4	221.1	277.6
Prices, domestic farm products (BLS, Aug., 1939 = 100)	300.9	290.1	340.2
Prices, finished steel composite (*Iron Age*, lb)	3.705c	3.705c	3.720c
90 stocks, price index (Standard & Poor's Corp.)	123.0	121.7	134.1

*Date of latest week for each series on request.

ston, Pa., Armory Sept. 10, with a score of 99.666+. The contest was witnessed by several thousand spectators and among those attending or officiating were officials of both the U. S. Bureau and the Pennsylvania Department of Mines, coal-company operating and safety heads and union officials.

The Hazleton Shaft Outside team, Lehigh Valley Coal Co., placed second in the meet, with a score of 99.666. Runner-up teams and their scores were: Raven Run Coal Co., 99.466; Reliance colliery, Philadelphia & Reading Coal & Iron Co., 99.399+; Southern Division, Glen Alden Coal Co., 99.399; and Coal Brook colliery, The Hudson Coal Co., 99.333.

First prize in the contest, presented by George Roos, P. & R. vice president, included a cash award of $25 per team member and the John Ira Thomas Trophy, plus a cup donated by the Mine Safety Appliances Co. and a prize donated by the Pennsylvania Department of Mines. Cash prizes for members of teams placing second to fourth, respectively, were $20, $15 and $10, with team members placing fifth and sixth receiving $5 each.

Members of the winning team are shown above with several officials of the meet as follows: Andrew Wilson (standing, left), Pennsylvania state mine inspector; John T. Ryan Jr., vice president, Mine Safety Appliances Co.; Nathan Jacoby; Victor Mildon; Benjamin J. Bela; Walter A. Conners; Richard Maize, Pennsylvania Secretary of Mines; George Roos, vice president, P. & R.; Walter A. Smyden (kneeling, left), captain; John Zendzion; and Herbert Hobbs.

Land Owner Sued For Stripping Damage

Damage to nearby property allegedly caused by strip operations carried on by a lessee resulted in the filing last month of a $100,000 damage suit by a Carbondale, Pa., resident against The Hudson Coal Co. The property is being worked by John Booth, Inc.

While the company is not mining in the area, the suit brough by Mrs. Mary Cardamon charged that Hudson "aided, abetted, approved and agreed to the quarrying and stripping of coal under its land in the City of Carbondale within a few hundred feet of the residence and garage of the plaintiff." The vast quantities of explosives used to break up the underlying rock caused walls and part of the building to fall and the plaintiff finally was required to leave the premises, the suit charged. The building owned by the plaintiff reportedly was wrecked by subsidences Feb. 19, 1949.

The suit is expected to prove an important test case in determining the liability of owners who lease land for mining by other operators.

•

Tennessee Group Seeks Synthetic-Fuels Plant

Plans are being formulated in Chattanooga, Tenn., seeking to reactivate the $68,000,000 Volunteer Ordinance Works at Tyner and convert it into production of synthetic liquid fuels from coal. Blaine Buchanan, attorney for some 200 coal

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In fact, a wire of this cloth can actually be bent around its own diameter without fracture.

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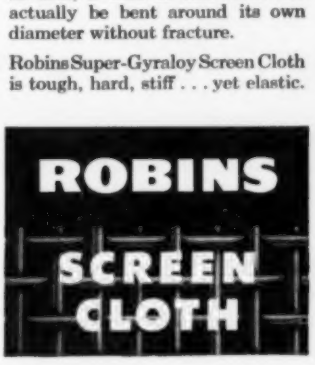

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Simple interlocking sections provide for instant assembly of any length desired. Six to one lengthwise collapsibility permits packing fifteen feet lengths into a space 30" long. Comes in sizes 5" to 24" in diameter.

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LONG WEARING
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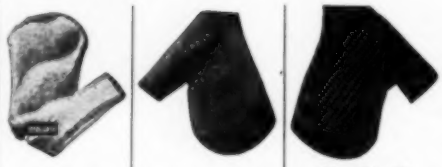

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Chrome leather with palm patch
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Chrome leather with steel reinforced palm patch
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mines and coal land operators, reported that Senators Kenneth McKeller and Estes Kefauver have announced their support of the plan.

The ordinance works was constructed during the war to make explosives but has been idle since the war's end. Investigations are being conducted with a view of turning the works into a 10,000-bbl-a-day plant to use about 6,000 tons of coal per day.

•

PMWA Group Splits Kentucky Welfare Fund

An average of $173.21 each has been ordered paid to 224 members of the PMWA in Kentucky. The payments, together with funds ordered set aside for attorneys' fees and court costs, represent a total of $45,401 remaining in the welfare and retirement fund of District 5, PMWA. District 5 no longer has any contracts with operators in Hopkins County. The ruling was handed down Sept. 14 by Hopkins Circuit Judge H. F. S. Bailey.

•

Beating Brings Fines to Five Alabama Miners

Five UMWA members were found guilty Sept. 12 at Bessemer, Ala., on a charge of beating a mine electrician who defied the union's order for a three-day work week. The men were fined $100 each. A sixth was bound over to the grand jury on a charge of assault with intent to murder. The men were arrested following the beating of T. A. Warnell, Fairfield, Ala., on the night of July 10. Mr. Warnell had explained to UMWA members that he was not required to obey the order because his work as an electrician was maintenance, not production.

•

Coal Dealers Weather Detroit Gas Influx

Some 250 retail coal dealers in the Detroit, Mich., metropolitan area appeared to be meeting the threat of new natural-gas competition, it was reported last month, following what many believed would become a crisis for them as a result of the sudden announcement by the Michigan Consolidated Gas Co. that it was ready to take on an unlimited number of space-heating customers.

New gas space-heating customers had been banned since 1942, except for a brief period early in 1946, but the completion by Michigan Consolidated of a new pipeline from the Texas natural-gas fields eased the supply situation. The gas company has announced that it has received about 60,000 new space-heating applications and installation personnel re-

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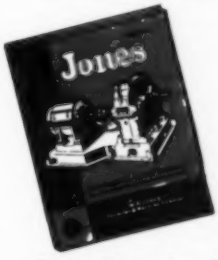
Jones Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1 in ratings from 1.3 to 440 H.P. Double (Type DH) reducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly. Liberal stocks are carried to facilitate shipments.



Here's Complete Information About the Application of Herringbone Reducers

This 128-page catalog of Jones Herringbone Reducers presents a vast amount of data relating to Herringbone Reduction Units. Illustrations show a broad range of herringbone reducer applications and the technical information shows how to select reducers for all conditions of service in accordance with the A.G.M.A. recommended practice.

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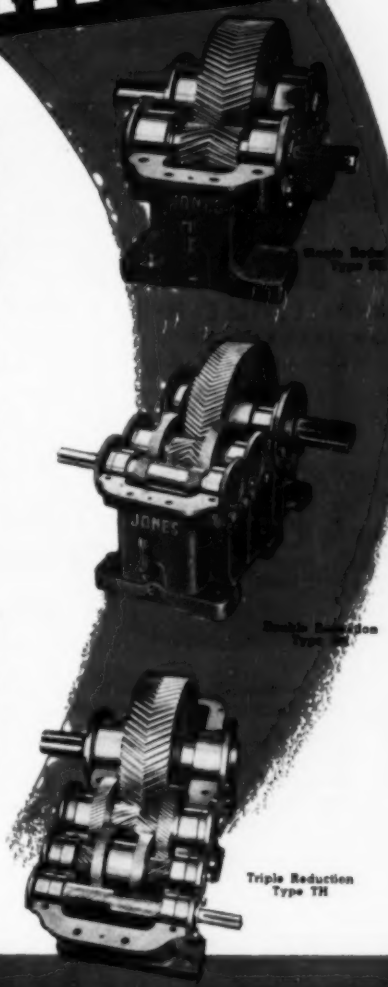

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SHAFT BLOCKS • FRICTION CLUTCHES • REVERSE COMPLINGS

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portedly have been working day and night to complete installation of gas-conversion units before cold weather sets in.

According to reports, some coal dealers first feared that domestic coal used in the Detroit area would be cut by at least 10% from the annual consumption of 2,500,000 tons, and perhaps nearer to 20%. Experience has proved these fears groundless. For one thing, gas conversion is taking place at a slower rate than predicted. Coal demand is brisk and prices have not only held but have gone up, with Pocahontas coal, for example, selling from $16 to $17.50 a ton. Also, some customers who applied for gas reportedly have changed their minds and purchased coal.

At the same time, Detroit coal dealers have not taken the situation lying down. A coal-selling institute held at the Tuller Hotel was well attended. Dealers have increased their advertising, stepped up their selling technic and are offering better service to customers, reports indicate. According to Ford Cate, manager of the Detroit Coal Bureau, whose members are said to handle 94% of the coal tonnage in the area, the dealers now are quite confident and none have been forced out of business so far. A number of dealers are selling gas units and others are handling stokers and oil-burning units.

•

B. & O. Puts 5 Diesels in Service; Will Add More

Five new diesel-electric locomotives already are in service and two more will start running soon on mountain grades on the B. & O. R.R. between Newburg and Terra Alta, W. Va. The new locomotives are four-unit jobs totaling 6,000 hp per locomotive. Oil storage tanks and servicing facilities are being set up at M. & K. Junction, W. Va. The new diesels will replace several Mallet-type steamers, which will be put into helper and road service at other points on the railroad's lines.

•

Gasoline Cost from Coal Not High, Bureau Reports

Unlimited quantities of premium motor gasoline now could be produced from coal at a cost that would increase the current service station price to the consumer by only 3 to 4c a gallon, James Boyd, director, U. S. Bureau of Mines, said Sept. 6 in releasing a new report on estimated plant and operating costs for coal hydrogenation. Through the sale of by-product phenols, for which demand may be limited, a few initial plants could produce gasoline at even lower cost.

Reportedly one of the most comprehensive and significant studies completed thus far under the synthetic-

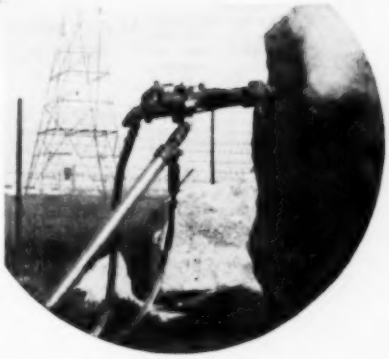
NEW Thor SINKER LEG

45% MORE FOOTAGE AT FAR LESS COST!

Here's real savings in labor . . . man hours . . . and drilling costs . . and 45% more drilling footage by actual tests!

The miner can carry the entire setup—Thor Sinker and Thor Leg—into the smallest tunnel or closest corner, set it up in an instant, start the hole . . . and then let Thor do the work! All he does is control the *constant pressure* feed by operating two simple throttles—*the only automatic controls in leg operation!*

Think of the savings . . . both in operating costs and air consumption. With carbide bits the Thor Leg can replace drifters—and heavy mountings on scores of heavy duty operations . . . can drift in tunnels where drifters won't fit. Write today for catalog data.



FULLY AUTOMATIC—A quick, easy setup—just start the hole—set the leg at any angle between 30 and 45 degrees. .the leg does all the lifting—all the constant pressure feeding . . . control the feed with a turn of the wrist!

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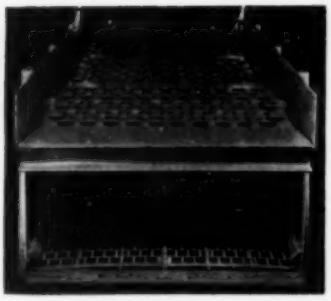

Accuracy of sizing, freedom from clogging, and high production is assured when Hendrick Perforated Metal Plate is used on vibrating and shaking screens. Uniformity of mesh is maintained throughout unusually long service life.

Hendrick Perforated Plate can be furnished, either flat or corrugated, with any required shape and size of perforations, in tank, high carbon, high tensile and abrasion resisting steels, stainless steel, and in other commercially rolled metals.

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Power end is made of hi-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 5 x 5; Capacity, 50 gals. per minute, 2" suction and 2" discharge.

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liquid-fuels research and development program, the study clarifies many of the inconsistencies found in published cost estimates for producing such fuels commercially.

In recognition of the complex factors responsible for these wide variations in estimates, two sets of cost calculations are presented—one for a modernized plant incorporating process improvements and the other for a conventional plant following European practice. In addition, basic calculations are given for five typical coals: Pittsburgh-seam bituminous, Wyoming and Illinois bituminous, Montana subbituminous and North Dakota lignite.

The study indicates that the capital investment for a modernized commercial plant with a daily capacity of 30,000 bbl would range from 243 to 258 million dollars, depending on the coal used. Improvements incorporated, such as the gasification of coal under pressure, reduce the investment and operating costs and increase the thermal efficiency materially in comparison to plants built in England and Germany prior to 1939.

"The versatility of the coal hydrogenation process is well established by the variety of products made—motor and aviation gasoline, diesel and jet fuels, fuel oil, and even wax and lubricating oils," the publication states. "Very satisfactory performance is anticipated with high-volatile American coals which are available in huge quantities in many parts of the country."

A free copy of Report of Investigations 4564, "Estimated Plant and Operating Costs for Producing Gasoline by Coal Hydrogenation," may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

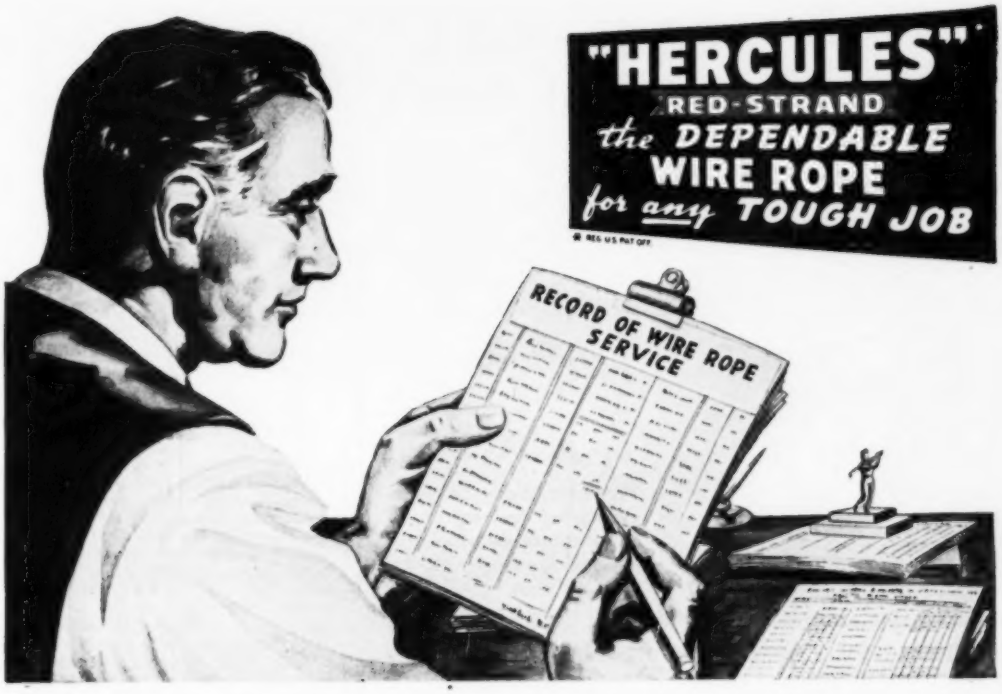
•

July Mine Fatalities Continue Downward Trend

Injuries at coal mines in the United States during July, 1949, caused the deaths of 26 men, according to the U. S. Bureau of Mines. Production during the month was estimated at 29,961,000 tons and the fatality rate was 0.87 per million tons, as compared with the July, 1948, rate of 1.77, later revised to 2.02.

In bituminous mines, there were 24 fatalities in mining 26,040,000 tons, for a fatality rate of 0.92, as compared with a similar preliminary rate for July a year ago of 1.66, later revised to 1.89. Falls of roof and face accounted for 41.6% of all bituminous fatalities, underground haulage for 37.5%, explosives for 8.3% and the remainder resulted from electricity, surface and open-cut.

Anthracite mines reported two fatalities in the mining and preparation of 3,921,000 tons, for a rate of 0.51, compared to a preliminary rate



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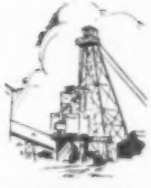

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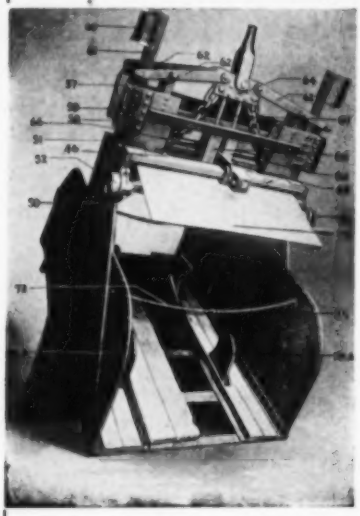

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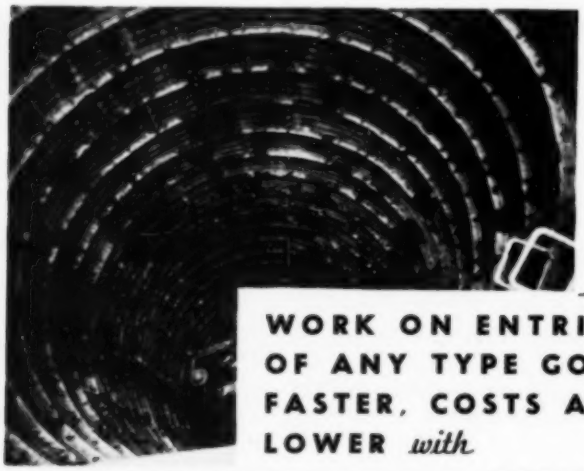

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for July, 1948, of 2.98, later revised to 3.44. Falls of roof and face and explosives each accounted for 50% of the total.

For the first seven months of 1949 as compared with 1948, bituminous mines reduced the number of fatalities by 38% and anthracite mines by 42%. Bituminous fatality rates through July, in 1949 and 1948, respectively, were 1.12 and 1.52; for anthracite, 2.00 and 2.59, respectively.

•

Keystone Study Reports 1948 Company Output

While the bituminous coal industry as a whole increased its tonnage output 18% between 1941 and 1948, 21 of the nation's 32 top bituminous producers boosted their output 54.7%. Yet in 1948, the largest single producer accounted for only 4.6% of the total 594,000,000 tons mined, as against 5.1% in 1941. These facts and others recently were revealed following a study of coal-company production records by *Keystone Coal Buyers Manual*, a COAL AGE affiliate.

Biggest factors in the increase between 1941 and 1948 were higher operating efficiencies, expansion of existing mines and plants, development of new mines and wider use of machines, reported J. R. Forsythe, manager of *Keystone*. Mergers also accounted for some of the tonnage increases, he added. Companies figuring principally in mergers were Pittsburgh Consolidation Coal Co., The Pittston Company and Walter Bledsoe & Co.

Of the total 1948 bituminous production, 83%, or 493,554,028 tons, was mined by 642 operating groups, each producing 100,000 tons or more per year. These groups comprised 904 companies. The remaining 100,445,972 tons, or 17% of the total, was produced by an estimated 7,200 companies. The top 32 operating groups, comprising 95 companies, mined 214,922,047 tons, or 36.2% of the total.

In the anthracite industry, 10 leading producer groups mined 66.8% of total output and the largest single producer accounted for nearly 15% of the total 57,000,000 tons.

One hundred producer groups, comprising 246 companies produced, in 1948, almost 324,000,000 tons, or 54.6% of the total. This continuation of the trend away from monopoly is shown by the fact that the percentage of production of producers of one million tons and over has declined steadily from the high of 62% reached in 1942 and again in 1943 to a low of 54.6% in 1948. That high mark in 1942 and 1943 actually reflects, according to *Keystone*, the remarkable meeting of the challenge of war needs by the industry's leaders.

Strength and stability among larger producing groups is indicated by the fact that only three of the 116 organizations that produced over 1,000,000 tons in 1941 had dropped out

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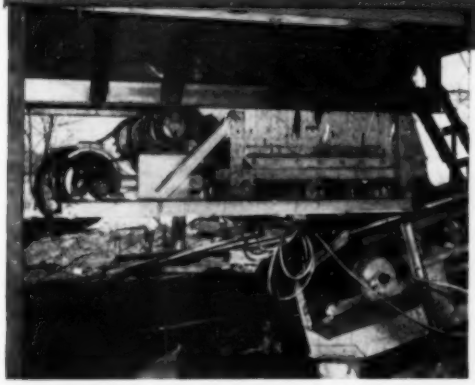

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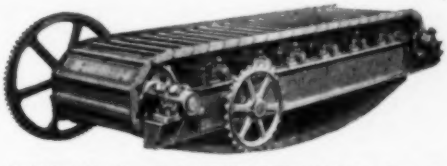

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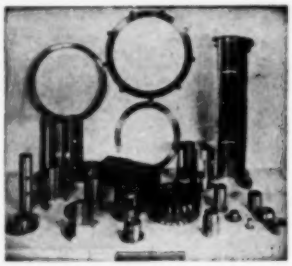

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of the over-a-million-ton class by 1948. One of the three, an anthracite management company, bowed out altogether. One bituminous group sold its properties and another curtailed operations about 50%.

On the other hand, lasting power was somewhat less for the bituminous industry as a whole, *Keystone* reported. Of the 642 groups producing over 100,000 tons each in 1948, 99 reached this figure for the first time. Meanwhile, 161 groups belonging in this class in 1947 either went out of business or dropped below the 100,000 ton mark by 1948. This incidence of change from 1947 to 1948 was 35%.

The year ahead—1950—will see a continuation of increased production by many producer organizations. *Keystone* says this has been revealed by recent correspondence revealing a confident expectation of continuing increased tonnages because of immense reserves of high quality coals, development of new mines and acquisition of new and virgin coal lands.

Figures on strip and contour mining show that over-all output from this type of operation declined 6% between 1947 and 1948. However, *Keystone* points out, like the larger deep-mining organizations, the larger strip-mining companies actually increased their tonnage in that period. In 1948, 38 groups producing over 500,000 tons each mined 57,874,842 tons, or 44% of total strip-mine output. In 1947, 40 organizations produced 55,981,736 tons. Nine of these top 38 stripping groups in 1948 also operated deep mines. Eight stripping companies, all of which increased their relative standing between 1941 and 1948, mined 3,000,000 tons or more in 1948.

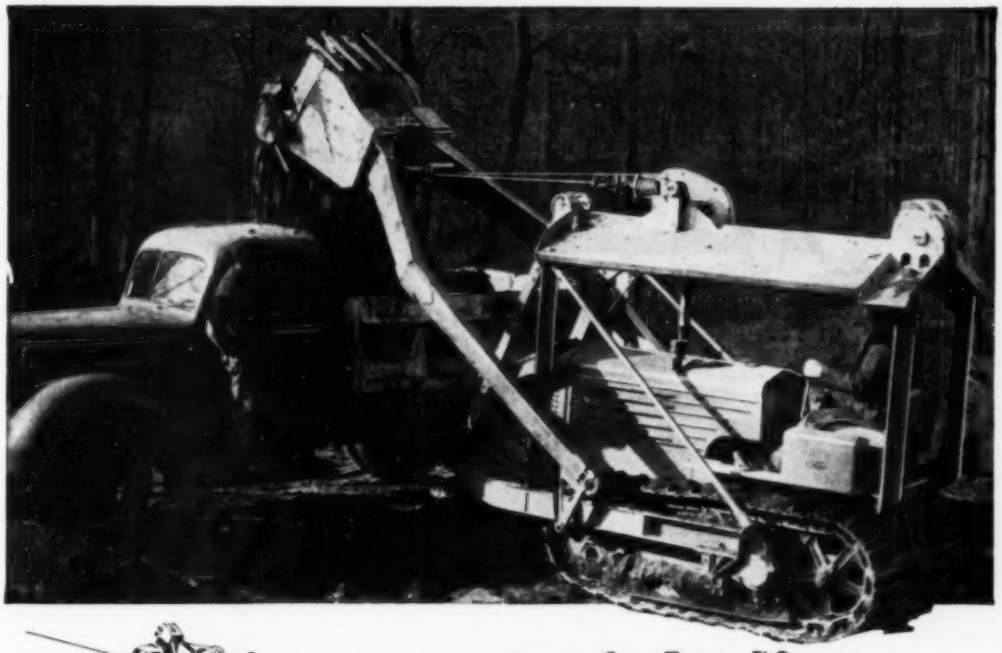
"Captive" tonnage in 1948 continued a decline that began in 1947 but reports of new mines in development and purchase of new coal lands indicate that "captive" tonnage will turn upward again in 1949 or 1950, *Keystone* predicts. The steel industry mined approximately 64% of the "captive" tonnage in 1948; railroads, 16%; electric utilities, 9%; and miscellaneous industry, 11%. Pittsburgh Plate Glass Co. became a new producer in the "captive" class in 1948 after buying the Midvale mine in Ohio.

Actual tonnage figures of all coal producers for 1948 in the 100,000-ton range or over are listed in the new booklet "Coal Production in the U. S. A. for 1948, by Companies," which can be secured from the *Keystone Coal Buyers Manual*, 330 West 42nd Street, New York 18, N. Y. The price is $5 per copy.

•

Kentucky Companies Bring Unfair Labor Charge

Charges of unfair labor practices brought by four Kentucky coal mining companies against District 23, UMWA, were scheduled to be aired Oct. 11 at a National Labor Rela-



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This unit crowds *directly* back in digging or loading . . . moves *directly* forward to load out trucks. The shovel arms swing *directly* over the tractor. Contrast this fast action to ordinary loaders where the tractor must crowd into the pile . . . back out . . . turn around and travel to truck or dumping pile. Easy to see why jobs move so much faster . . . why you can really cut costs!

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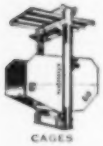
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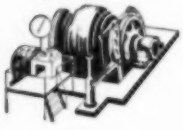
SKIPS

LOWERING SPIRALS

CAR PULLER AND RETARDERS

LABORATORY CRUSHERS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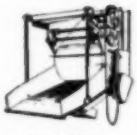
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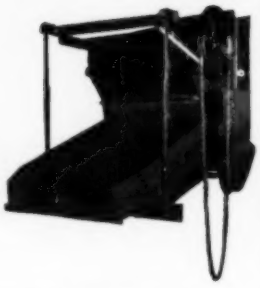

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tions Board hearing in Madisonville, Ky.

The complaint, growing out of union activity in which several thousand union miners marched against non-union mines early this summer, was filed with the NLRB against the union and three of its officers by the West Kentucky Coal Co., Colonial Coal Mining Co., Homestead Coal Co. and Badgett Mine Stripping Co.

•

Regional Directors Named For Bureau of Mines

Appointment of regional directors for seven of the nine regions recently set up by the U. S. Bureau of Mines has been announced by Dr. James Boyd, director. The regional-administration plan recently put into effect by the Bureau (*Coal Age*, September, p 150) is designed to decentralize administration of the Bureau's work and provide more efficient operation and better service to the public.

Regional directors, their headquarters and the area included, are as follows: Region 1, Sinclair H. Lorain, Alaska; Region 2, Stephen M. Shelton, Albany, Ore., Washington, Oregon, Idaho and Montana; Region 3, H. C. Miller, San Francisco, California and Nevada; Region 4, J. H. East Jr., Denver, Colo., Wyoming, Utah, Colorado, Arizona and New Mexico; Region 5, Paul Zinner, Minneapolis, Minn., North and South Dakota, Nebraska, Minnesota, Iowa, Wisconsin and Michigan; Region 6, Kansas, Missouri, Arkansas, Louisiana and Texas, director and headquarters not announced; Region 7, Tuscaloosa, Ala., states south of Tennessee-North Carolina northern borders and west to the Mississippi River, director not named; Region 8, H. P. Greenwald, Pittsburgh, Pa., Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Indiana, Illinois, Kentucky, New York, New Jersey, Delaware, New England States and the Synthetic-Liquid-Fuels plant at Louisiana, Mo.; Region 9, Elmer W. Pehrson, Washington, D. C., foreign mineral operations.

•

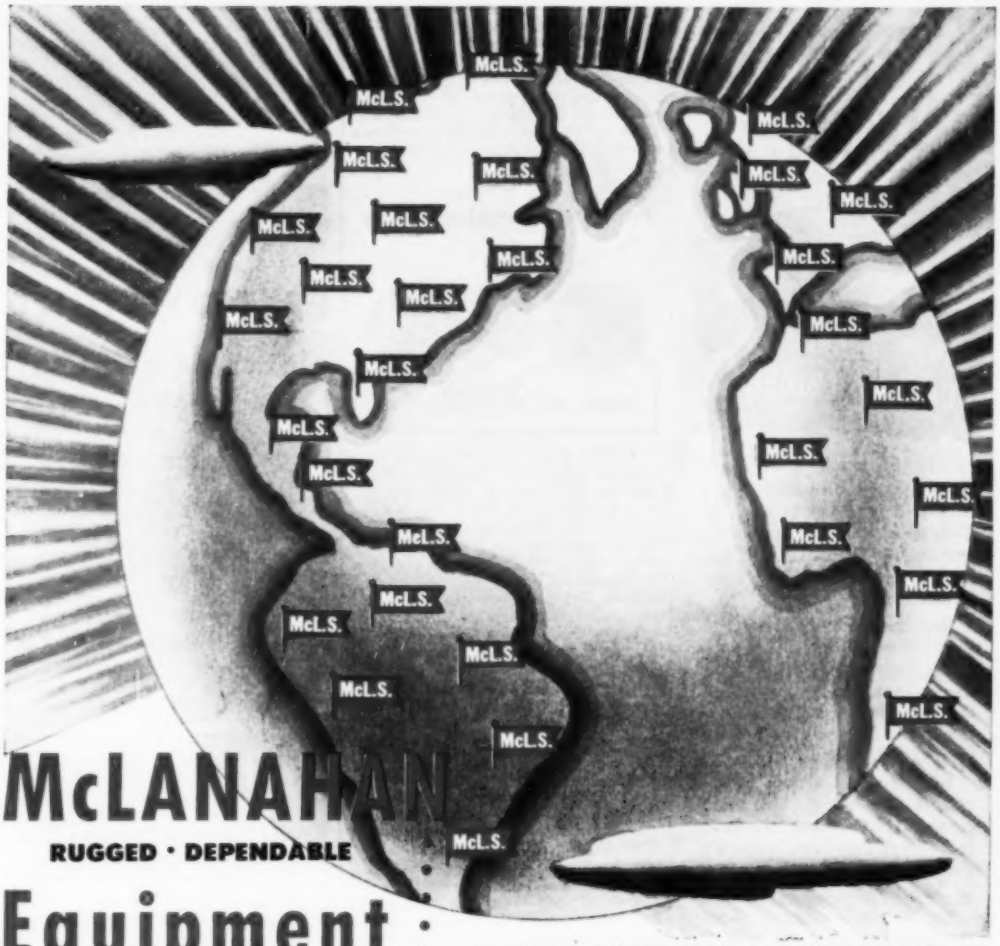
Maryland Bureau Moves

The office of the Maryland Bureau of Mines has been moved from Annapolis to the City Bldg., Westernport, Md., under Frank T. Powers, director, who succeeded Dr. J. J. Rutledge, now consultant to the Bureau.

•

Report Lobbying Costs Against Ohio Belt Plan

Lobbyists for the railroads and Ohio railroad representatives spent almost $32,000, including salaries, during the last session of the Ohio legislature in their fight against approval as a public utility of the proposed 103-mi cross-Ohio conveyor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belt (*Coal Age*, March, 1949, p 122), according to the expense accounts on file with the Ohio Secretary of State recently made public.

Two representatives of the conveyor-belt interests listed expenditures of slightly over $900, without salaries, the report revealed.

•

Foreign Developments

AUSTRALIA — The Victorian government reportedly has approved expenditures of nearly £8,000,000 for a new briquet works at Morwell, in Grippsland, where there are large deposits of brown coal. Negotiations are being completed for purchase of the equipment in Great Britain and the British Zone of Germany, with expenditures to be divided about equally between the two countries. The first briquet factory at Morwell is expected to begin operation early in 1953 and the second about six months later. The two plants will have a combined production of about 1,300,000 tons of briquets a year, a considerable increase over the production of 500,000 tons yearly obtained at Yallourn, near Morwell.

Shortly after the return to work of Australian miners in mid-August, the Joint Coal Board announced that New South Wales miners would begin working three shifts in most of the state's 16 open-cut mines in an effort to increase production by about 1,500,000 tons a year. The board expected to increase the number of men employed in open-cut mines from 800 to 1,200 and it was hoped that the weekly output would be increased from 30,000 to 60,000 tons a week as a result of the new work schedule.

The Coal Industry Tribunal has granted miners throughout Australia three months' leave on full pay after each 10 years' service. The three weeks' annual holidays are not affected by the granting of the long-service leave. For service since June 14, 1949, long leave accrues at the rate of one-eighth of a day for each five consecutive shifts worked, but for work before that date miners are given credit at the rate of five days for each year of service, up to 13 years' past employment.

The court decision was made after long hearings, interrupted on June 27 by the nationwide coal strike lasting more than seven weeks. The Miners' Federation had sought 26 weeks' long service leave for every 20 years' service, to operate retroactively.

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As a penalty for the strike, the court ruled that one day's leave will be deducted for each week of the strike. It also announced that similar sanctions will be applied in the event of new strikes. In common with other government employees, miners employed by state-owned coal mines have had the advantage of long service leave before the court imposed this concession on private coal owners. Most of Australia's coal is mined by private collieries.

•

Coal Publications

De Laval Engineering Handbook. by A. H. Church and Hans Gartmann. De Laval Steam Turbine Co., Trenton 2, N. J. 294 pp. 5¾x8-in; cloth. $2. A new edition comprising 7 sections: mathematical, mechanical and fluid information; steam turbines; centrifugal pumps; IMO pumps; compressors, blowers and exhausts; helical reduction gears; and worm reduction gears. Formulas, logarithmic and other tables, graphs, sample-problem solutions and illustrations.

Present Status of the Development of Hand-Fired Smokeless Coal Heaters, by Julian R. Fellows. University of Illinois Engineering Experiment Station, Reprint Series No. 44. 24 pp. 6x9-in; paper. 15c, University of Illinois, Urbana, Ill. Design, burning performance, smoke output and response to thermostatic controls of the Illinois Smokeless Furnace, now in commercial production.

Coal Resources of Montana, by J. X. Combe, D. M. Brown, H. F. Pulver and D. A. Taylor, U. S. Geological Survey, Circular 53. Free, Director, U. S. Geological Survey, Washington 25, D. C. The first of a series of state summaries reappraising coal reserves of the nation. Minimum reserves in Montana are estimated at 221,779,000,000 tons. Data are given by counties, ranks of coal, classes of coal and thickness of beds.

Safety Course for Bituminous-Coal Miners—A Handbook for Miners. 75c, Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. Designed for individual miners as well as classes taking the Bureau of Mines' safety course. Seven sections, as follows: accidents from falls of roof and coal; haulage accidents; explosions and fires; electrical accidents; explosives accidents; accidents in mechanized mines; and miscellaneous accidents.

Anthracite Mechanical Mining Investigations, by J. W. Buch and Andrew Allan Jr. U. S. Bureau of Mines. 8x10½-in; paper. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. Two reports, as follows:

Progress Report I: Preliminary Underground Tests of the Bureau of

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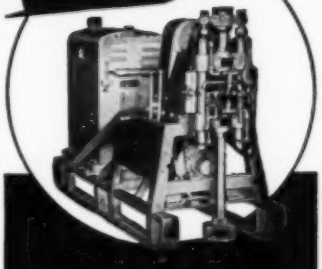

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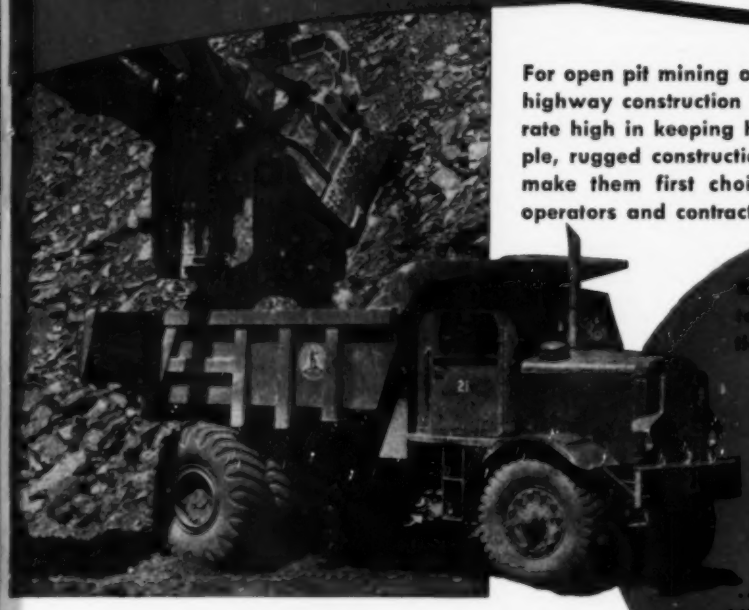

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Mines Scraper-Shaker Loading Machine for Driving Gangways. R. I. 4500. 9 pp. plus 3 pp. of illustrations. Performance studies of a machine consisting of a scraper slide to which a shaker-conveyor drive with drive trough is attached. The scraper gathers coal and/or rock from the gangway face and delivers it to the shaker-conveyor drive trough. The trough line extends far enough along the gangway to load mine cars. Improvements will be built into the machine before it is retested.

Progress Report II: Preliminary Testing of Eickhoff Shearing Machine, Model DEK. R. I. 4501. 14 pp. plus 16 pp. of photos and graphs. Performance studies of a compressed-air shearing machine with conventional bar and endless-chain design. The shearing mechanism is mounted on a crawler chassis which permits cutter bar and motor to rotate 360 deg about a vertical axis. Preliminary tests show that power requirements are low and that the machine is practicable for shearing anthracite. Redesign probably will provide some means of dust control, better safety and better adaptability to work on the pitch.

Sampling and Determination of Aldehydes in Diesel-Engine Exhaust and in Mine Air, by H. W. Busch and L. B. Berger. U. S. Bureau of Mines, R. I. 4531. 9 pp. plus 2 pp. of illustrations and graphs. 8x10½-in; paper. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. Description of practicable sampling and analytical procedures.

A Study of Stray Electric Currents in Airdox Systems in Coal Mines, by C. F. Brown, F. J. Gallagher and John Hyvarinen. U. S. Bureau of Mines, R. I. 4537. 13 pp. plus 7 pp. of graphs. 8x10½-in; paper. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. Hazards arising from stray currents in the earth's strata, water and air lines, steel cables and other current-carrying media may be reduced by (1) installing main lines of Airdox tubing in well-maintained back entries remote from all power circuits; (2) bonding Airdox tubing securely to track where track is used as a power conductor and Airdox tubing is installed in the same or a parallel entry; (3) providing bonds of ample current-carrying capacity between air lines and track and installing bonds permanently; (4) careful design and maintenance of underground power systems; and (5) avoiding the grounding of electrical equipment to mine tracks except where Airdox lines and tracks are bonded together at frequent intervals.

Estimated Plant and Operating Costs for Producing Gasoline by Coal Hydrogenation, by L. L. Hirst, J. A. Markovits, L. C. Skinner, R. W. Dougherty and E. E. Donath. U. S. Bureau of Mines, R. I. 4564. 83 pp. plus 23 pp. of drawings and graphs. 8x10½-in; paper. Free, Publications

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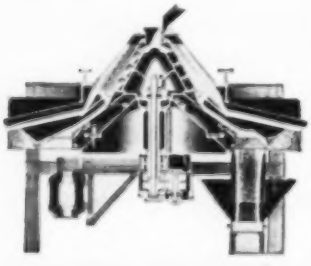

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Sunday Creek Coal Co., Hobson, Ohio—Contract closed with K. Prins & Associates for river-loading plant, including truck-dump hopper, feeders, picking belts, crusher and barge-loading belt conveyor; capacity, 2,000 tpd of crushed coal in barges.

Sunday Creek Coal Co., Rend-Mar tipple—Contract closed with K. Prins & Associates for rebuilding of tipple destroyed by fire, consisting of two-car rotary dump and belt conveyor for loading 200 tph of r-o-m on two tracks, with r-o-m to be prepared at new preparation plant at Corning, Ohio.

Sidwell Bros., Shawnee, Okla.—Contract closed with K. Prins & Associates for coal-washing plant for cleaning 5x0-in coal, including Prins washer, triple-deck Simplicity screen for dewatering and sizing washed coal, and related conveyors for handling cleaned-coal refuse and coal slurry; capacity, 100 tph.

Ethel Chilton Mines, Inc., Ethel, W. Va.—Contract closed with K. Prins & Associates for Prins "Stream-cleaner" to clarify coal-washery water at the rate of 500 gpm.

Pizzoli Coal Co., Atlas, Pa.—Contract closed with Wilmot Engineering Co. for Type A Wilmot Simplex Jig to prepare nut coal; feed capacity, 15 tph.

Johnson Coal Co., Shamokin, Pa.—Contract closed with Wilmot Engineering Co. for Type A Wilmot Simplex jig to prepare stove and nut coal; feed capacity, 15 tph.

Thos. W. Schneck, Suedberg, Pa.—Contract closed with Wilmot Engineering Co. for two Type A Wilmot Simplex jigs to prepare stove and nut coal; total feed capacity, 30 tph.

Swatara Coal Co., Goodspring, Pa.—Contract closed with Menzies Separator Co. for one 6-ft. Menzies cone to clean stove and chestnut; feed capacity, 40 tph.

Legal Coal Co., Goodspring, Pa.—Contract closed with Menzies Separator Co. for one 6-ft. Menzies cone to clean buckwheat, rice and barley coal; feed capacity, 40 tph.

Meadowside Coal Co., Dunmore, Pa. Contract closed with Menzies Separa-

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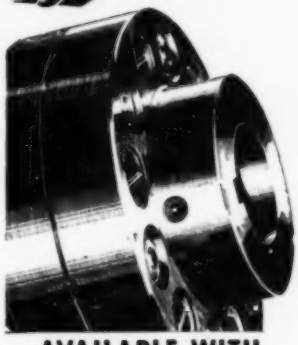

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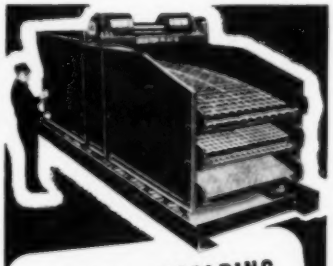

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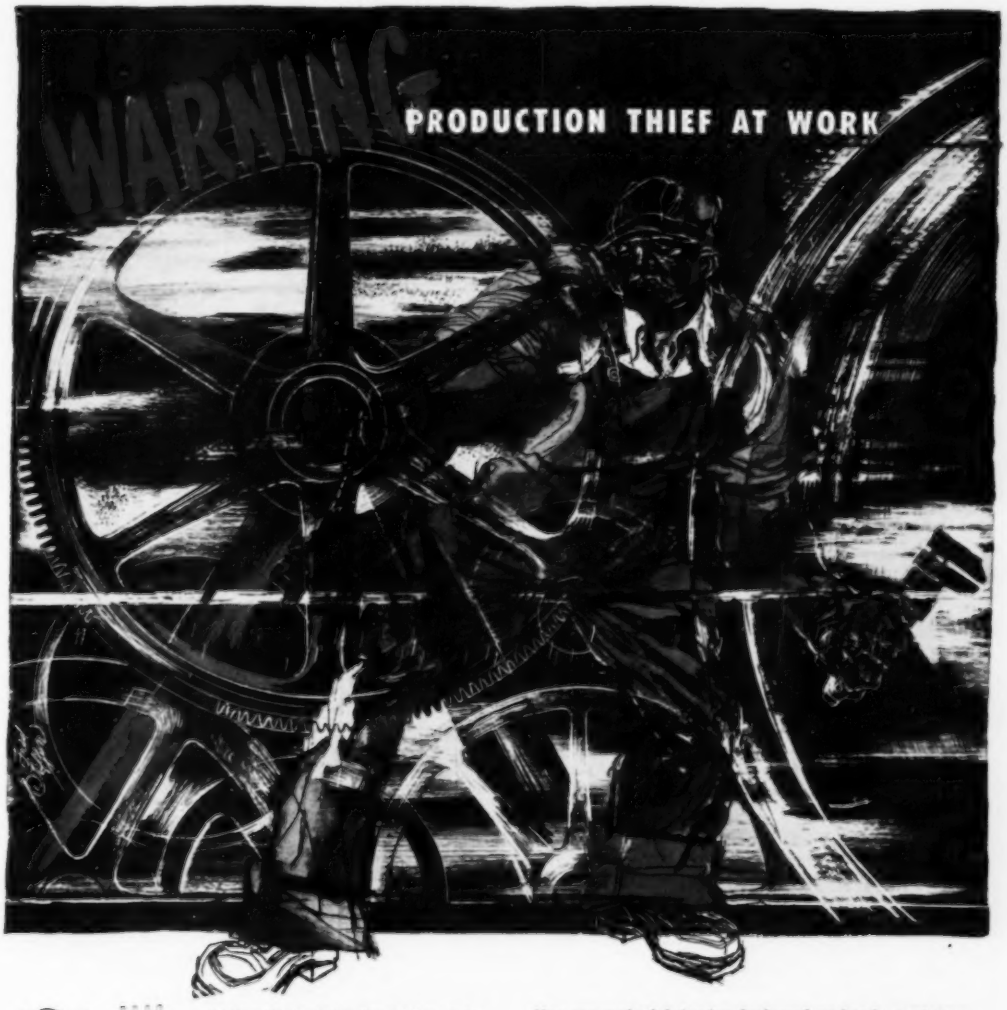

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Millersville Coal Co., Millersville, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean broken and egg coal (5½x2½-in); feed capacity, 90 tph.

M. K. & F. Coal Co., Middleport, Pa. Contract closed with Menzies Separator Co. for one 5-ft. Menzies cone to clean stove, nut and pea coal; feed capacity, 30 tph.

Moffat Coal Co., Taylor, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean barley coal; feed capacity, 70 tph.

Hoover Mining Co., Paxinos, Pa.—Contract closed with Menzies Separator Co. for one 6-ft Menzies cone to clean stove, chestnut, pea, buckwheat, rice and barley coal, separately or one size at a time; feed capacity, 40 tph.

Morgan Coal Co., Old Forge, Pa.—Contract closed with Menzies Separator Co. for four 4-ft Menzies cones to clean pea, buckwheat, rice and barley coal, respectively, feed capacity of each, 22 tph (cones previously installed in Mineral Springs breaker).

Mammoth Coal Co., Raven Run, Pa.—Contract closed with Menzies Separator Co. for one 10-ft. Menzies cone to clean egg, stove and chestnut refuse, feed capacity, 110 tph; and one 10-ft. Menzies cone to clean broken and egg (5½x2½-in), feed capacity, 140 tph (cones formerly installed in Mineral Springs breaker).

Glen Alden Coal Co., Baker colliery, Scranton, Pa.—Manufacture by Glen Alden Coal Co., by agreement with Menzies Separator Co., of one 8-ft. Menzies cone to clean buckwheat, feed capacity, 70 tph; one 8-ft. Menzies cone to clean rice, feed capacity, 70 tph; and one 8 ft. Menzies cone to clean barley, feed capacity, 70 tph.

Meadowside Coal Co., Meadowside breaker, Dunmore, Pa.—One 13½-ft-diameter Chance cone, previously used in the Van Storch breaker of the Penn Anthracite Collieries Co., for cleaning buckwheat and larger sizes; capacity, 125 tph.

Pompey Coal Co., Pompey breaker, Jessup, Pa.—One 8x8-ft square-top Chance cone for cleaning buckwheat and smaller sizes; capacity, 50 tph.

Southern Collieries, Inc., Lake City, Tenn.—Contract closed with Fairmont Machinery Corp. for addition to existing plant consisting of one 5x18-ft American Twin-Dex pneumatic separator for cleaning ¼x0-in coal; capacity, 40 tph.

Ingle Coal Corp., Ditney Hill mine, Elberfeld, Ind.—Contract closed with Templeton-Matthews Corp. for addition to existing plant of heat-drying installation consisting of two Baughman Verti-vane heat dryers with stoker-fired furnace, conveyors and other equipment to reduce moisture of ⅞x0 run-of-mine to permit air cleaning; capacity, 125 tph.

Tennessee Coal, Iron & R. R. Co., Concord mine, Ensley, Ala.—Contract closed with Deister Concentrator Co. for 16 SuperDuty Diagonal-Deck No. 7 coal-washing tables to clean ¼x0 (in addition to 24 similar units previously reported).

Haven Coal & Supply Co., Tremont, Pa.—Contract closed with Deister Concentrator Co. for two Super-Duty Diagonal-Deck No. 7 coal-washing tables to clean No. 5 buck.

Bethlehem Collieries Corp., Ellsworth, Pa.—Contract closed with Deister Concentrator Co. for two Type 108 Concenco revolving feed distributors.

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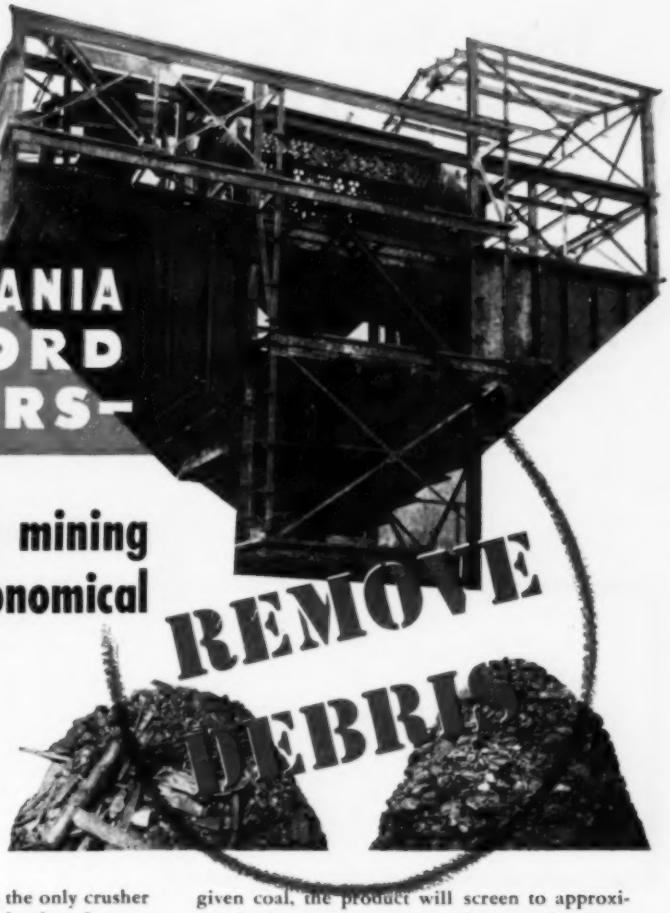

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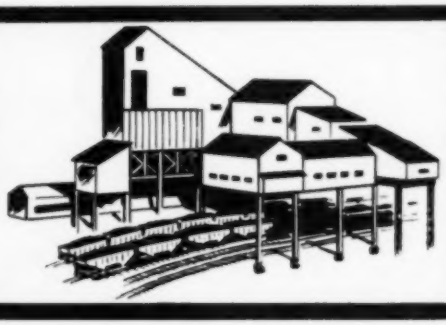
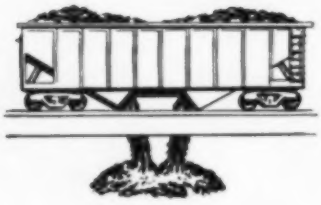
How You Can SPEED UP WINTER HANDLING OF COAL

• Economical STERLING ROCK SALT Can Help You Speed Up Cold Weather Operations All Along the Line

AT THE MINES

• An unexcelled anti-freeze around the mines, Sterling Rock Salt *removes* treacherous snow and ice, eliminates costly delays, helps prevent accidents, and saves labor during freezing weather. It costs only about half as much as other, less effective, chemicals, yet it is more efficient, and melts more ice. Sterling Rock Salt is easy to handle, stores well, and is harmless to coal and harmless to the hands and clothing of workers.





IN THE CARS

• Your customers will gladly pay the small premium for coal treated with Sterling Rock Salt at the mines. Rock Salt prevents freezing of coal in transit. The cost is repaid many times over by the elimination of the delay and expense in thawing cars of frozen coal. Men and equipment are freed for delivery of coal to users!

HOW TO USE STERLING ROCK SALT

For Anthracite Coal—First dump the required amount of Sterling Rock Salt—5 to 8 pounds per ton of coal—on loading platforms. Your regular car loaders then spread a light application of the salt over hopper doors in empty cars. Wet coal feeds from loading chutes, workers rhythmically shovel the rest of the salt onto the coal for even distribution. More salt is readied as the runner places the next car.

For Bituminous Coal—Usually loaded dry into cars, bituminous coal generally needs but 5 pounds of Sterling Rock Salt per ton of coal. The best method is to apply about a quarter of the salt around the doors and bottom of each car, and distribute the rest uniformly through the coal as it is loaded from the chutes.

For De-icing Hoppers at the Colliery—All cars received at the colliery coated or partially filled with snow or ice should be cleaned out thoroughly before loading. About 75 pounds of Sterling Rock Salt should be spread over the hopper doors and car floor. The ice and snow will either run out completely as brine, or be in such a state that the hopper can be opened and the ice jarred out.

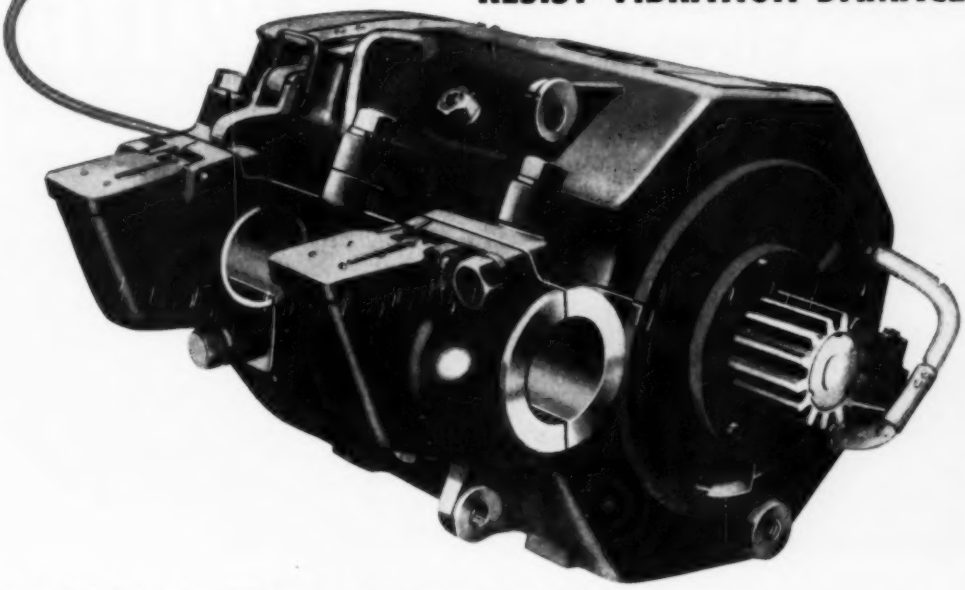
Order STERLING ROCK SALT *Now!*

IN CARLOADS, BULK, OR HANDY 100-LB. BAGS

INTERNATIONAL SALT COMPANY, INC. **Scranton, Pa.**

Welded by National—

YOUR MINE LOCOMOTIVE FIELD FRAMES RESIST VIBRATION DAMAGE



More than half of the failures which occur in mine locomotive motors are from mechanical, rather than electrical, causes. Mechanical failures develop most often from misalignment and a lack of rigidity.

The split field frame is particularly subject to vibration and misalignment. It was designed for convenience of repair, but it increased the burden of maintenance tremendously.

At Bluefield, West Virginia, and Grundy, Virginia, we have shops especially equipped to weld old-type split field frames into solid box-type frames. Combined with preventive maintenance—rebuilding motors at pre-determined intervals based on ton miles of service—average maintenance costs can often be just about cut in half. Our Bluefield and Grundy shops are experienced in all phases of mine locomotive maintenance, redesign and repairing.

Welding insures unchanging air gaps. Continuity of the magnetic circuit is made certain. Ball bearing failures are reduced. All in all, length of life is increased, possibility of sudden failure is reduced.

As each motor needs maintenance work, let National build *real* service into it—and start it on a preventive maintenance schedule.

AT GRUNDY, VA., ADDRESS NATIONAL ELECTRIC SERVICE CORP.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO — BLUEFIELD, W. VA.

Every Feature is Vital!

- Haul 30-40-60 ton payloads
- High speed (25-30 mph.)
- Climb grades up to 20%
- 100% four-wheel traction
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..and only ONE truck gives them all...

WALTER
4-POINT POSITIVE DRIVE
TRACTOR TRUCKS

300 hp. Walter Tractor Truck, with 30-ton bottom dump coal trailer.

AT mines where high tonnages must be hauled under severe and punishing conditions, Walter Tractor Trucks stand out . . . and stand up!

Walter Tractor Trucks, with the exclusive Four-Point Positive Drive, get more haulpower out of every horsepower. All four wheels drive with maximum tractive effort at all times. The Walter automatic locking differentials proportion torque to each wheel according to the traction available at any instant. There are never spinning or slipping wheels to stall loads, rip roads and wear tires. This feature permits hauling payloads or overburden on soft ground, mud, snow, slippery surfaces.

Walter Tractor Trucks are available in models from 200 to 300 hp., to meet your tonnage and body requirements. Have a hauling engineer call without obligation. Or, write for detailed literature.

• 200 hp. Walter Tractor Truck with 20-ton back dump body. Compact unit for coal haulage—ideal for mine waste disposal.

WALTER MOTOR TRUCK CO.
1001-19 Irving Ave.
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1 Pump...

- ... ***that*** gives you multi-stage benefits in a single stage pump.
- ... ***that*** reduces operation and maintenance costs through balanced impeller design and replaceable liners.
- ... ***that*** handles widely varying heads with little loss of capacity and no change in operating speed.
- ... ***that*** handles heads at more than 500 feet at an operating speed of only 1750 r.p.m.
- ... ***that*** minimizes vapor-locking.
- ... ***that*** is available in sizes from 1 to 200 g.p.m.

The Fairbanks-Morse Westco is the ONE pump that gives you all these advantages for lower cost pumping. Ask your Fairbanks-Morse pump distributor or branch pump engineer for the complete story. Fairbanks, Morse & Co., Chicago 5, Ill.

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a name worth remembering

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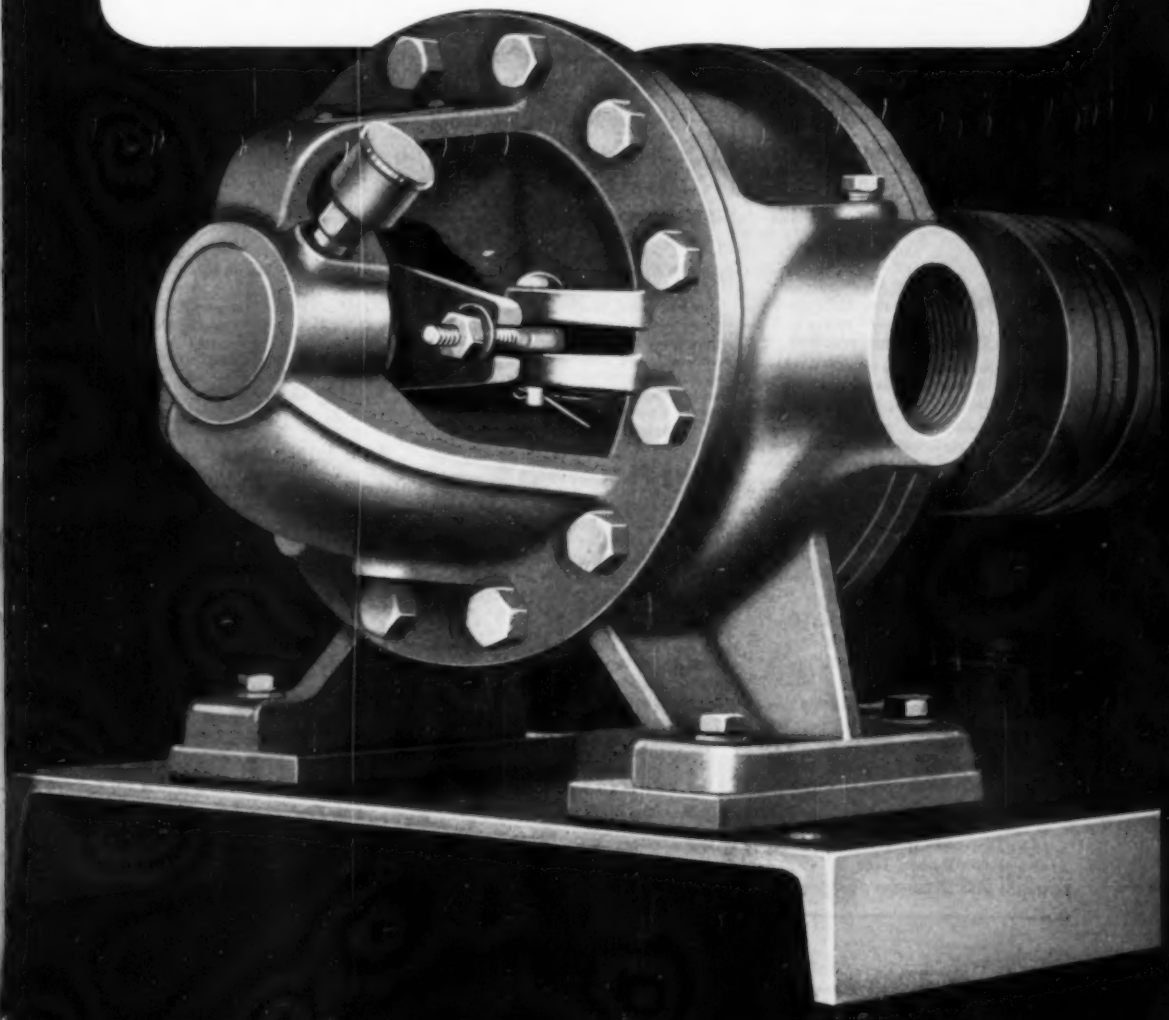


New R and S Froth Flotation Hydrotator

★ RECOVERS MARKETABLE COAL FROM SLUDGE ORDINARILY WORTHLESS

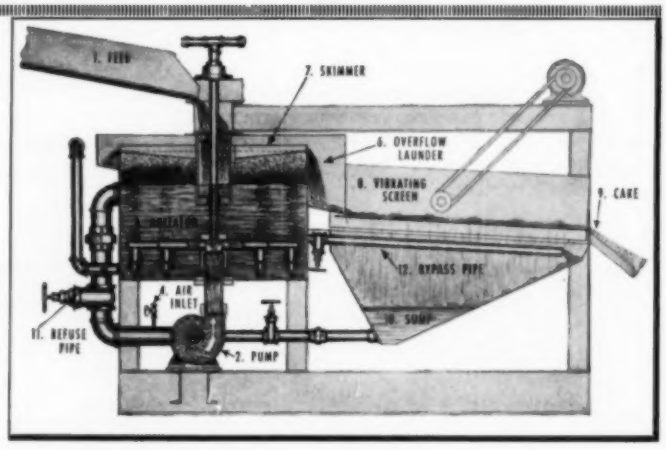
★ *MINIMIZES POLLUTION OF STREAMS AND RIVERS* ★ *RECOVERS COAL WITHOUT SETTLING*

What it Does

The new R and S Froth Flotation Hydrotator cleans and separates fine coal from sludge formerly considered of no commercial value.

It recovers coal without settling; yet the equipment occupies only a fraction of the space required by a thickener large enough to effect similar recovery by gravity. Froth is killed instantly and delivered in cake form.

Water is clarified and pollution of streams and rivers is minimized—important today in view of increasing government regulation on this point.



How it Works

1 After suitable conditioning, coal enters tank through Feed Chute and Feed Well.

2 Circulating Pump takes water from side of main tank and delivers it to tank bottom through . . .

3 Agitator, which distributes circulating water and coal uniformly over tank bottom, from where they rise to pump intake level.

4 Air is drawn into pump through a valve, is distributed over bottom with water and coal. Coal rises with air bubbles as . . .

5 Froth, which overflows into . . .

6 Overflow Launder, with aid of . . .

7 Skimmer, attached to rotating Feed Well and Agitator. Froth flows to . . .

8 Vibrating Screen, which "kills" froth and delivers it as . . .

9 Cake (low ash and dewatered). Water and entrained high ash coal, together with excess reagent, pass screen to . . .

10 Sump, where they join pump circulation and are returned to main tank.

11 Refuse, with all excess water from feed, is discharged from tank bottom by adjustable tube which controls level of water below frothing zone.

12 Bypass pipe to provide sluicing water.

Result of Years of Study

Incorporated in the R and S Froth Flotation Hydrotator are features developed by R and S engineers through years of study and experiment. Every important detail of this new unit has been checked and rechecked under actual operating conditions in Roberts and Schaefer Company's own plant.

Testing Plant Service

In addition to its experimental laboratory function, the R and S Testing Plant is available for testing carload samples representative of your actual production. Users of this service receive a detailed report which includes: (1) Complete screening test showing percentages of various sizes; (2) Cleaning test on each size, showing raw coal, cleaned coal and refuse with ash and sulphur percentages on each and rejection obtained; (3) Complete float-and-sink determination on total sample with theoretical washability curve; and (4) Conclusions and recommendations. If desired, the entire car of cleaned coal may be reshipped for further full scale coking or boiler plant tests. The only charges are for labor and power—no charge for engineers' services.

More Information

For complete details on this new Roberts and Schaefer equipment, for information on Testing Plant Service, and for competent counsel on your individual coal preparation operations, get in touch with R and S engineers. They can help you make prepared coal profitable coal.

As a step in the right direction, why not send for the full story of the new Froth Flotation Hydrotator. Write for Bulletin No. 172 . . . today.

ROBERTS and SCHAEFER CO.

130 North Wells Street, Chicago 6, Illinois

2801 Broadway Avenue, Pittsburgh 16, Pennsylvania

P. O. Box 570, Huntington 10, West Virginia

254 West 54th Street, New York 19, New York

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Again available... AO C1300 line of metal spectacle goggles provides peak protection against flying particles with the utmost in wearing ease.

SAFETY FEATURES include orbit-shaped, Super Armorplate lenses (or 6 Curve Super Armorplate lenses) scientifically hardened to resist impact...strong double-braced bridge ... close-to-face frame ... amply ventilated side shields for side protection where necessary.

COMFORT FEATURES include lightness of goggles on the nose... flexible, acetate rocking nose pads — large enough to distribute pressure over a wide area ... insulated temples which are heat resistant and perspiration proof ... a variety of goggle sizes for precise fitting of the individual worker. Your nearest MSA Representative can supply you.

Recommended Uses

Clear Lenses Without Side Shields. For frontal protection on operations such as machine and hand tool work, chemical and physical lab. work.

Clear Lenses With Side Shields. For frontal and side protection on operations such as chipping, grinding, riveting, machine work, hand tool, spot welding and bottling operations.

Calobar Lenses. When above operations also involve danger from glare, heat, ultra-violet and infra-red radiations, Calobar lenses should be worn. Also recommended for welders' helpers (under helmet), workers near welding work, railroad men, truck drivers and helpers, bus drivers and others needing protection from wind, dust, cinders, flying particles and glare.

American Optical
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

GOYNE PROCESS PUMPS

A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

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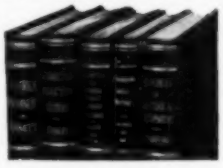

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WILL PULL 10 TO 110 TON LOADED CARS

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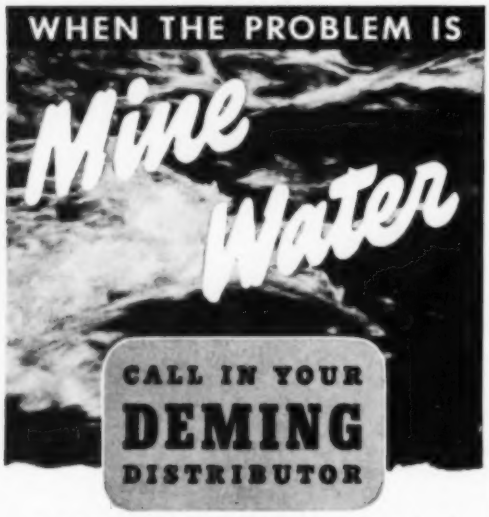
OUR PRODUCTS HAVE BEEN GIVING SATISFACTION SINCE 1903



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Six stationary models (powered by electric motor) cover a range of capacities from 10 to 300 gallons per minute against heads up to 250 feet. One portable type (powered by gasoline engine) has a capacity range of 10 to 90 gallons per minute against respective heads of 80 to 15 feet.

For pumping corrosive water, certain models of these pumps are designed with casing and stuffing box separate from and bolted to the support head. This permits furnishing the liquid end parts of special alloys with resultant economy of having the support head of standard cast iron construction.

BULLETIN No. 3300-A

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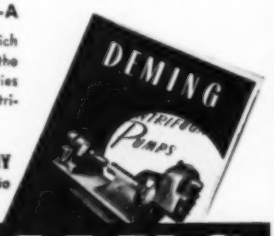

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The Standard for Over Forty Years

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The "Sutton" Sand Dryer may be fired with any type of fuel. While most "Sutton" Sand Dryers are equipped to burn coal, they can be furnished with burners for natural gas or fuel oil.

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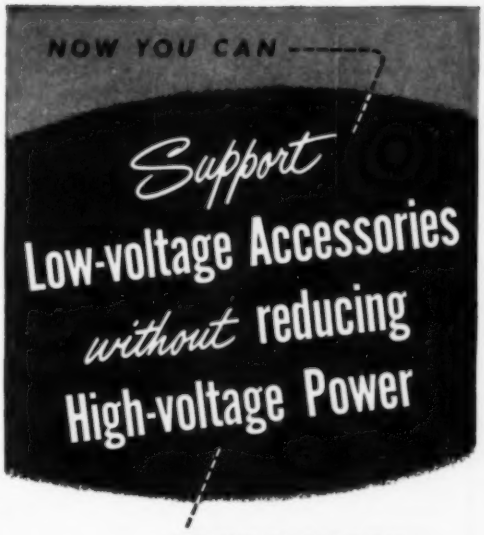

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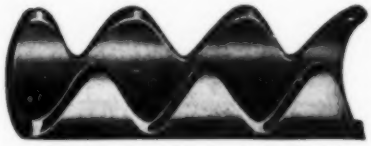
Use up your scrap cable by turning it into Rail Bonds. Canton Welding Bonds are easily applied—made from ductile steel. Use any combination of cable to attain ample capacity for return current.



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For the past 20 years I have been employed by one of the largest coal companies in the State, as their Electrical Engineer, and am now open for a position due to the mines working out.

My experience covers all phases of supervision of installation, operation and maintenance of A.C. and D.C., automatic controls, hoists, all underground equipment, M.G. Sets, Convertors, Turbines, Power Plants, and rate relations with Public Utilities.

If you can use a high class man who is not afraid of work and long hours to produce results, I would appreciate an opportunity for a personal interview.

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For fully mechanized coal mine in West Virginia with large production.

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230 acres under lease. $45,000 net profit last year; 28 reliable employees. Fully equipped and electrified operation, 100 miles from Cleveland S.E., 40 inch high quality vein; analysis on request. High lift shovel, trucks, all in top condition. Total price, all stock included $75,000.

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A small acreage of Blair Seam (87½ inches) in Buchanan County, Va. A truck mine, one mile over good road to loading dock.

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Moisture	1.73
Ash	2.58
Volatile	31.26
Fixed Carbon	64.43
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Sulphur	.89

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2—100 ton, diesel electric, tractive effort 59,700#, four traction motors, new 1940-42, excellent condition for ICC.
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2	200 KVA G-E	6900/11950Y—460/230/115
3	150 KVA G-E	22000—2300/4000Y
3	150 KVA G-E	11000—2300/4000Y
3	150 KVA G-E	6600—220/440
3	150 KVA L-M	2400/4160Y—120/240
2	150 KVA A-Ch	2400—120/240
2	100 KVA G-E	33000—2300
3	100 KVA G-E	11000—2300/4000Y
6	100 KVA G-E	11500—230/460
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1—Ottumwa Iron Works conical drum hoist, serial #3163, weight 35,000#, 1¼" rope, complete with remote control and hydraulic brake. Direct connected to GE 300 HP motor, model #CM647, type TPC-5017, form M 3/60/2200V, 870 RPM, 72½ amps, 270 secondary amps, complete with automatic switchboard.

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1—Ottumwa Hoist #3561, drum diameter 48", face 36", face grooved for 1" rope, equipped with post brake 94" diameter, hand operated, single reduction rui spur gears, 19 teeth and 190 teeth, 1¼" pitch, 10" face, drum shaft 7" diameter, drum shaft bearing 7"x16" pinion shaft bearing 4½"x15" of the ring oiling type, direct connected to 100 HP. Westinghouse motor, type CW, 230 volts, 3 phase, 60 cycle, 360.8 amps, 840 RPM, #2304852.

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1—8 ton Goodman ball bearing locomotive, 42" gauge, type 32-AO-4T.
1—8 ton Westinghouse locomotive, 36" gauge, Class 4-2-35-C-487.
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4—CLE5 AC, 3 phase, 60 cycle, 220 volt, Sullivan longwall mining machines.
1—Goodman Universal Mining Machine, 112AA, DC, 6½' cutter bar.
1—Jeffrey Shortwall Mining Machine, 35 BB, AC, 6' cutter bar complete with tip turn truck, cable and reel.
1—Sullivan Shearing Machine, Class CH11, DC, 9' cutter bar.
2—Sullivan Longwall Mining Machines, type CH8, 3/60/220 volts, 30" cutter bars.
1—Sullivan shearing machine, class CH 11 AC.
1—12AA Goodman mining machine, 50 HP, 42" gauge.

MOTOR GENERATOR SETS

1—90 KW GE motor generator set type CD 122, form A, comp. wound, 327 amps, 250 volts no load, 275 volts full load, 1200 RPM, cont. 50 deg. cont., #1529906 direct connected to 125 HP GE syn. motor type TS, form PK, frame 7358, 3/60/2300 volts, 1200 RPM, 27.6 amps, cont. 40 deg. cont. Excitation 250 volts 8.8 amps. .74 PF, #4314971, complete with switchboard.

2—200 KW Ridgeway syn. motor generator sets, 2300 volts AC, 1200 RPM, 250-275 volts DC, complete with switchboard, one has brand new GE automatic circuit breaker.

1—75 KW Westinghouse synchronous motor generator set, DC end, 250 volts, 300 amps, 900 rpm. Direct connected to 125 HP, 2200 volt, 900 rpm, 3 phase, 60 cycle, 28.6 amp, synchronous motor, complete with automatic switchboard and compensator.

50 KW Westinghouse motor generator set, DC end 250 volts, 200 amps, #211, type S, field serial #621994, commutator, #211-17-135B, 840 RPM, compound wound, AC end, 75 HP Westinghouse induction motor, type CS, 3 phase, 60 cycle, 2,200 volts, 18.1 amps, per terminal, 40° C temp. rise, 870 rpm, #4364196, complete with switchboard for DC end and compensator for AC end.

30 KW General Electric motor generator set, 250084, type BR, form C, I.S. 250070-30, 300 amps, 200 volts, 1740 RPM, cont. 50° C, direct connected to 75 HP General Electric induction motor, type KT337-4-75-1800 Form B, 3 phase, 60 cycle, 220 volts, 174 amps, 1,750 rpm, #4123203, cont. 40° C. complete with manual switchboard and compensator.

RAILS

Truckload and car lots of good second hand 16, 20 and 25 lb. rails.

Carload lots new 12 lb., 16 lb., 20 lb., 25 lb. and 30 lb. rails. Price and delivery information upon request.

ROTARY CONVERTOR

1—200 KW Westinghouse Rotary Converter complete with transformers and switchboards.

ELECTRIC DRILLS

1—Little Giant, AC electric coal drill size 473, 3 phase, 60 cycle, 220 volts, type IPF, serial #145533.
3—Dosley Electric drills, AC, 220 volts, new type.

COPPER

Several hundred feet used 500,000 CM Weatherproof stranded copper.

Several hundred feet used 500,000 CM Bare stranded copper.

Several thousand feet used 4/0 Figure 8 trolley wire.

Several thousand feet 1,000,000 CM lead covered copper.

1,800 feet 2/6 3/Conductor rubber covered cable—used.

Several thousand feet of used 6/0 Figure 8 trolley wire.

Several thousand feet used Conductor No. 6 2300 volt cable.

Several thousand feet used 300,000 CM Cable.

TIPPLE

1—Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

MINING MACHINES

11—612 AC Goodman Mining Machines, 3/60/220, 8½ ft. cutter bar.

DUCKBILLS

12—G20 Goodman Duckbills Complete, AC.
2—G20 Goodman duckbills, DC.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

FOR SALE

MOTOR GENERATOR SET

150 KW GE 3 wire, 250/125 volt, 1200 RPM, driven by 225 HP GE synchronous motor, 8 PP, 3 phase, 60 cycle, 440 volt, 1200 RPM. Complete DC panel and AC starting equipment.

Price very reasonable; write for complete details. We have many other items.

Send us your requirements.

ELECTRIC MAINTENANCE SERVICE CO., INC.
143 Bennett Street
Bridgeport, Connecticut

M-G SETS — ROTARIES
3 ph. 60 cy.

500 KW West. 550 v.—710 HP 2300 v. Syn.
450 KW G.E. 275 v.—2300 v. Syn., 720 RPM
200 KW G.E. Rotary 275 v. with 2-110 KVA 2300/4000 v. Transformers and control.
800 KW West. 230 v.—433 HP Syn. 2300/4000 v.
200 KW G.E. 275 V.—300 ¶ Syn. 2300/3/60.
250 KW West. SK 650 v. 2300 v. Syn., 1200 Rev.
150 KW West. 125-225 HP Ind. 2200/440/220 v.
100 KW Bldy 275 v.—150 HP Syn. 2300 v.
100 KW West. 125 v.—150 HP Ind. 2200/440/220 v.
50 KW G.E. 250 v.—70 HP Syn. 220/440 v.

MOTORS AND GENERATORS

300 HP. West. CW 2300/3/60 600 RPM S.B.
300 HP. G.E. I M 2300/3/60 450 RPM S. B.
150 HP. G.E. KT 220/440 v., 695 RPM.
100 HP. G.E. Type 1 K 2200/3/60 600 RPM S. C.
150 HP. G.E. Syn. 220/440/3/60 600 RPM.
150 HP. West. CS 220/440/3/60 500 RPM S. C.
100 HP. Al. Ch. ART 2300/3/60 600 RPM S. B.
100 HP. G.E. IM 440/220/3/50 450 RPM S. B.
75 HP. West. SK 153, 230 v. 1150 RPM.
60 KW West. SK 250 v. 1350 RPM Gen.
60 HP. West. CS 220/440/3/60 1200 RPM S. C.
30 HP. West. SK 93, 230 v., 1750 RPM.
150 KW Triumph 250 v. 600 RPM Gen.
150 KW G.E. 550 v. BC 1150 RPM Gen.
125 KW West. SK 250 v., 900 RPM Gen.
100 KW West. SK 250 v., 600 RPM Gen.

TRANSFORMERS

1—100 KVA Al. Ch. 2200 v.—220 v.
6— 75 KVA G.E. 2400 v.—240/480 v.
3— 50 KVA G.E. 2400 v.—240/480 v.

LOCOMOTIVES
Haulage and Gathering

20/25 Ton G.E. 500 V. 42"/44" ga. 3HM824 B.B. Motors.

13 ton Jeff., 250 v. 44" Ga. MH11D.
10 ton Jeff. 250 v. 36/42" Ga. MH 110 Motors.
8 ton Goodman 500 v. 42/44" Ga. 9104CS.
8 ton Goodman 250 v. 42/44" Ga. 9104CS.
6 ton Jeff. 250 v. MH 88 Gath. 42" Ga.
6 ton West. 250 v. 904 Motors 36" Ga.
3 5 ton Goodman 36 B 250 v. 42" Ga. Gath.
3 4 ton Goodman, 250 v., 42" Ga. sgl. motor, gath.

LOADING MACHINES & SHUTTLE CARS

3—14 BU. Joy 250 V. D.C. permissible.
1—8 BU. Joy 220/3/60 A.C. permissible.
3—5 Ton Joy Shuttle cars with reels.
3—5 Ton Joy Shuttle cars with batteries.

STORAGE BATTERY LOCOMOTIVES

6 ton GE, Permissible BB Motors, 36/44" Ga.
5½ ton Ironton Type A 36/42 Ga.

MINING MACHINES

5—5SB 3ef. 250 V. permissible.
3—112EJ Goodman 250 V. permissible.
1—512 Goodman 50 ° A.C. 220/3/60 perm.
1—12G3 Goodman 220/3/60 open.

HOISTS, CRANES AND PUMPS

300 HP Lidgerwood sgl. fixed drum, 6½' dia., 3' face. 2" flanges grooved—1½" cable, 300 HP 2300/4000/3/60 Westgh. GW.

75 HP Diamond fr. 48" dia. 25" face, sgl.
75 HP Mead Morrison sgl. fr. drum—AC Motor.
1—50/75 HP 2 drum Meade Morrison slope.
50 HP Beyl & Patterson sgl. fixed drum, 4' dia.

PROMPT SHIPMENT ON ALL SIZES A. C. AND D. C. REBUILT MOTORS.

MOORHEAD ELECTRICAL MACHINERY CO.

Pittsburgh 19, Pa. **Mayflower 7900**

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Four — 14 Ton Plymouth Gasoline Locomotives, Type 3—Model JLC—for 36" track gauge.
Also—
21 Kappel 10 Ton—36" gauge cars.
Location: North Dakota

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Keystone Building
Kittanning, Pennsylvania **Phone 1000**

For Sale—3 late type Joy Cable Reel Timber Setters. The oldest of these machines was purchased in 1948, and all are in excellent condition and subject to inspection. They are being offered, subject to prior sale, for $5,800.00 each.

THE COAL SERVICE CORPORATION
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FOR SALE
Aerial Tramway

Continuous carrier type Interstate Tramway, approximately 5,200 feet long, with 7 intermediate supporting towers. Capacity 100 tons per hour. Top track cables 1¼" diameter, bottom return track cables ⅝" diameter. Material carried in 42 steel cars joined with 1" diameter haul rope. Cars hold capacity of approximately one ton.

Unit driven by 125 H.P. 440 volt, 3 phase, 60 cycle Motor. Electric control systems govern feeding and discharge dumps automatically.

Also one single carrier type tramway with span of approximately 660 feet, using single 80 cu. ft. capacity car operating on two parallel 1⅛" dia. track cables. Rated capacity approximately 125 tons per hour, driven by a 25 H.P. 440 volt, 3 phase, 60 cycle Motor. This unit takes material from the continuous carrier and dumps automatically about 100 ft. above ground. Both ends anchored in concrete blocks with intermediate 100 ft. Pivot Tower.

This is a rare opportunity. Tramway in perfect working condition and can be seen in actual operation at Eden, Vt. Relocation of mill will make its use unnecessary, after January 1, 1950.

HARDINGE DRYER

One Ruggles-Coles Class XF-12 Rotary Dryer arranged for parallel flow of materials and gases. Shell 80" dia., 40' long made of ¼" plate and lined with 5/16" liners, complete with exhaust fan and drive. Rated capacity of 50 to 100 tons per hour. Power required is a 50 H.P. for Dryer and 30 H.P. for Exhaust Fan. Address replies to Michael J. Messel, Superintendent. The Ruberoid Co., Hyde Park, Vermont, or to our New York office.

Vermont Asbestos Mines
Division of
The RUBEROID Co.

Hyde Park, Vt. Mines at Eden and Lowell
Executive Offices:
500 Fifth Ave., New York 18, N. Y.

Attention—Low Vein Coal Operators
FOR SALE
MANY ITEMS NEW OR NEARLY NEW

BELT CONVEYORS
1—2,000 ft. Goodman 26" Belt Conveyor, complete with 440 V.A.C. 25 HP. Motor, starting equipment. (Used about 2 months.)
1—1,500 ft. Goodman 26" Belt Conveyor, complete with 440 V.A.C. 20 HP. Motor, starting equipment. (Used about 1 year.)

CAR SPOTTERS
1—Vulcan Car Spotting Hoist with controls. (New.)
1—Vulcan Car Spotting Hoist. (Used.)

DUCKBILLS, ETC.
2—Goodman Duckbills with 30° swivels and extension trough.
1—Bell Crank.
15—Roof Jacks.

COMPRESSOR
1—Ingersoll Rand Air Compressor on wheels. 1 K 315.

CHAIN CONVEYORS, ETC.
2—Joy Chain Conveyors complete with Louis Allis 10 HP. D.C. Motor, 230 Volt (New.)
3—Joy Chain Conveyors complete with Louis Allis 10 HP. D.C. Motor, 230 Volt (Used.)
2—Jeffrey Tail Pieces and low pan. Miscellaneous conveyor pans & chain.
3—Joy Chain Face Conveyors with Louis Allis 5 HP. D.C. Motors, 230 Volt, starters, etc.

SHAKERS
1—E10-70 Goodman shaker with Goodman 10 HP. D.C. Motor, Type 112—1150 RPM.
2—E10-70 Goodman shakers with Westinghouse S.K. 10 HP. D.C. Motor, 230 V.—1150 RPM.
2—E-10-70 Goodman shakers (No motors.)

MOTORS
3—West. Type SK 230 V.—1150 RPM D.C., 10 HP.
1—West. Type CS 220-440 V.—1750 RPM A.C., 3 HP.
1—G. E. Type CD-5, 230 V.—850 RPM, D.C., 15 HP.
1—G. E. Armature—75 HP. for Motor 961416-7, Type RC 25—950 RPM—300 Volt D.C.

CUTTING MACHINES
3—Sullivan C E 7.
1—Sullivan C E 9.
1—Sullivan C L E 2.

ALSO
1—200 K W Motor Generator, 2200 V. A.C., 275/596 D.C., 900 RPM.

Inspection any time.
Write or phone for appointment.
A. L. Teasdale—Vice President
Morris Run Coal Mining Company
Morris Run, Tioga County, Penna.
Phone—Blossburg 10-R-2

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1—8-Ton Jeffrey 28" High, MH162, Roller Bearing Journals.
TIPPINS MACHINERY COMPANY
PITTSBURGH 6, PENNSYLVANIA

NEW and REBUILT
STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton 13" to 56" Track Gauge
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Greensburg, Pa.

BUY NOW—IMMEDIATE DELIVERY
Heavy Duty Milling Machines
Metal Working Shapers
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Boring Mills, Horiz. & Vertical
Morgan #170 Grd. Single End Punch & Shear.
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18 Ward St., Rochester, N. Y. Phone HAmilton 8745

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1—Aerial Tramway, American Steel & Rope Company, 2400 ft., 2—45 cu. ft. buckets powered by 50 H.P. motor.
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LOGAN, WEST VIRGINIA

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Guaranteed Like New—238 hrs.
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Hotel Norton — Phones 608 & 300

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Clinton, Missouri

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COAL CRUSHERS
Very Cheap
For Quick Disposal
1—24" x 36" Jeffrey Flextooth.
1—Large Wilmott Double Roll.
R. C. Jones & Company
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Phone 610

Coal mining machinery—#1 Several high pedestal JOY 14 B.U. LOADERS. Excel. condition, for sale or exchange against low pedstal type. #2 Several SHUTTLE CARS, JOY 32E. Excel. condition, for sale or exchange against lower type 31", maximum height. #3 FOR SALE: JOY 11 BU & 8 BU; GOODMAN 460 BH; LOADERS, SULLIVAN 7 AU CUTTERS. 6 AND 8 TON LOCOMOTIVE. Also: New space parts at substantial discount. Please ask for our list. Dealers protected.
FS 9912, Coal Age,
330 W. 42nd St., New York 18, N. Y.

LOCOMOTIVES, ALL 250 VOLT

2—6-Ton Jeffrey, MH-88, 42 to 48" gage with R5-E Motor Driven Reels.
6—4-Ton Jeffrey, MH-96, 42 to 48" gage with R5-E Motor Driven Reels.
1—12-Ton Jeffrey, MH-142, 48" gage, 31" high, with Extra Armature.
1—8-Ton Plymouth, Gasoline, 36" gage.
1—5-Ton Plymouth, Gasoline, 36" gage.

CUTTING MACHINES, 250 VOLT

5—11-B Sullivans, 50-HP, Permissible, with bug dusters & 7½' Bars.
1—Goodman Universal with 7' Bar, Truck & Pony Truck.

SUB STATIONS

2—150-KW. G.E. Synchronous Motor-Generator sets complete with manual switchboards. Motors 225-HP, 2200/4000 Volt, Generators 275 Volt.
1—100-KW Westinghouse 6-phase Rotary Converter complete with transformers and manual switchboard, 275 volt.
1—75-KW. West. Motor-Generator set complete, 2200 volt A.C., 275 volt D.C.
1—500-KW West. M-G Set complete with automatic board. 2200/4000 Volt A.C., 600 Volt D.C., will reconnect for 275 Volt D.C.

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2—150-HP. General Motors Diesels with 100-KW. G.E. generators and switchboards.
1—100-HP. Buda Diesel engine only.
1—97-HP. Buda Diesel engine only.
2—70-HP. Continental Red Seal engines only.

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1—Three Track, 300-TPH. Stephens-Adamson All Steel Tipple Complete.
1—36"x244' Jeffrey Belt Conveyor outfit in Steel Gallery.
29—Sanford Day Drop Bottom Mine Cars, 36" Gage.
12—Sanford Day Drop Bottom Cars, 48" Gage.
1000—42" Gage Lorain, end dump mine cars, Timken bearing, good condition.
1—24"x36" Jeffrey Flextooth Crusher.
3—200-KVA. G.E. Transformers 7620/13200 to 2300 volt.
2—37½-KVA. G.E. Transformers, 2300 to 110/220 volt.
3—25-KVA. G.E. Transformers, 2300 to 220/440 volt.
3—15-KVA. G.E. Transformers, 2300 to 220/440 volt.

Trolley & Feeder wire and hangers. A.C. and D.C. Motors and Starters. Speed Reducers. Sloop Equipment and lots of other items of mining equipment and supplies.

Your Inquiries Appreciated
Day or Nite Phone 610

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FOR SALE

4 Goodman Style G20H77 permissible Shaker Conveyors, latest type with 200 ft. size 3 troughs, manual Type HAD duckbill and 20 HP Westinghouse AC motor, 3 phase, 60 cycle, 220 volt, 1160 RPM.
4 Sullivan Class 7B Cutting Machines, with 50 HP AC motor, 3 phase, 60 cycle, 220 volt, and Bowdil cutter bar and chain, 9 ft. long, 5" kerf.
4 Chicago Pneumatic Style 574-700 post mounted coal drills, 220 volt, 60 cycle, 3 phase, AC.

All of above to include usual accessories and guaranteed to be in A-1 condition. New in 1943.

KAISER COMPANY, INC.
Iron & Steel Division
Sunnyside, Utah

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1—300 KW G-E Rotary Converter, 2/60/440 (transformers for 2300), 250/275 v. DC, 900 RPM; w/control.

C & S MACHINERY COMPANY
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Four Goodman Standard 50 H.P. machines. Also Two (2) 50 H.P. Universals.—One 994 Westinghouse 6 ton locomotive 250 Volts. One M.H. 96 4 ton Jeffery.—One (1) G.M.C. 120 H.P. Diesel Engine 75 K.W. Generator.— One (1) 30 B Goodman 5 ton 250 Volts.—100 K.W. G.E. 275 Volt Generator D.C.—Also 5 and 10 and 7½ H.P. Motors.

JOHN DeCORTE COAL CO.
425 Sinclair Ave. Cadiz, Ohio

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of **RUBBER PRODUCTS**
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CONVEYOR BELTING. TRANSMISSION BELTING. ELEVATOR BELTING. FIRE, WATER, AIR, STEAM, SUCTION and WELDING HOSE.

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

NEW GUARANTEED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers	Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices — Mention Size and Lengths.

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
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Sold In Matched Sets. Inquire For Prices — Mention Size and Lengths.

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FIRE HOSE
APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
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	25 "	13.00
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1"	25 "	10.00	1.50 Pair
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LARGER SIZES ALSO AVAILABLE
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I.D. Size	Length	per Length	I.D. Size	Length	per Length
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	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

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62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArclay 7-9793

SPECIAL PRICE—200 KW G.E. CONVERTER, —TRANSFORMER & SWITCHBOARDS $4500.00

200 KW General Electric ROTARY CONVERTER, 250 volts DC, 1200 rpm., pedestal type, with available SWITCHBOARDS—and TRANSFORMER. REWOUND to meet buyer's requirements (13,200 volts or lower).

Can be inspected here. Subject to prior sale.

ALSO IN STOCK

150 kw G.E. Rotary Converter complete.
New Motors—Popular make—Big Discount.

R. H. Benney Equipment Co.
5024 Montgomery Road Norwood 12, Ohio

FOR SALE

225 HP Busch Sulzer 150 KW diesel engine generator set.
30 ton American steel stiffleg derrick, 100 foot boom.
100 ton Baldwin diesel electric switching locomotive.
35 ton Ohio locomotive crane. Gas powered. Built 1943.
150 HP portable firebox boiler. ASME Code. 250# steam pressure.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St. St. Louis 1, Mo.

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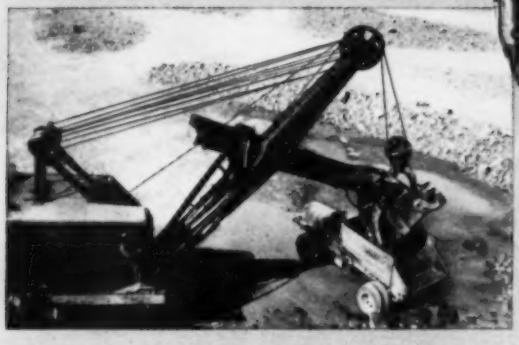

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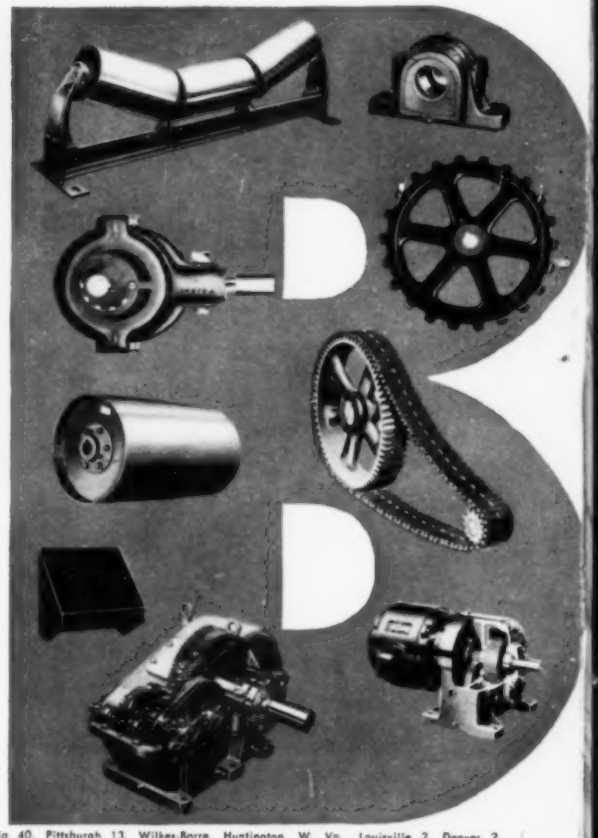

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